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DECEMBER 26, 1949
VOLUME 38, NO. 26

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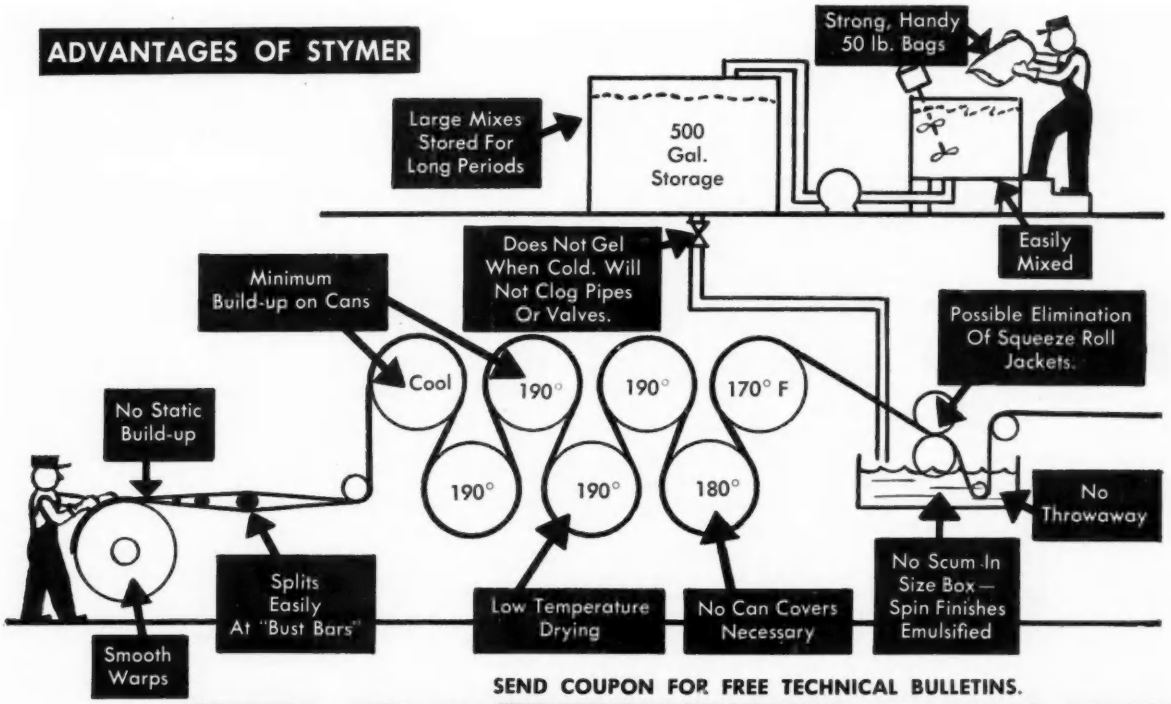

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Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Departments

Patent Digest 955
Trade Notes—New Products 956
Index to Volume 38 ..... 966A

• Proceedings of the American Association of Textile Chemists and Colorists

General Technical Session:
Recent Results of Textile Research Institute and Textile Foundation Research P934
J. H. Dillon

Textile Education and Research P949
Bertrand W. Hayward

Annual Business Meeting P943
South Central Meeting P944
Report of Utica Technical Institute Student Chapter . P944
Report of Clemson Student Chapter P944
Reports to Corporate Members (Bonnar and Little) . P945
Changes in Research Committee Personnel P946
News Items from the Research Committee P946
Report of New York Section P946
Evaluation of Dispersing Agents to Aid in Dyeing Cellulose Acetate Specifically and New Fibers in General P947
Stainless Steel Equipment Corrosion Survey P947
Employment Register P948
Calendar P950
Annual Banquet Session:
The President's Address P951
Henry F. Herrmann
Of Interest to Members of Research Committees . . P952
Membership Applications P953

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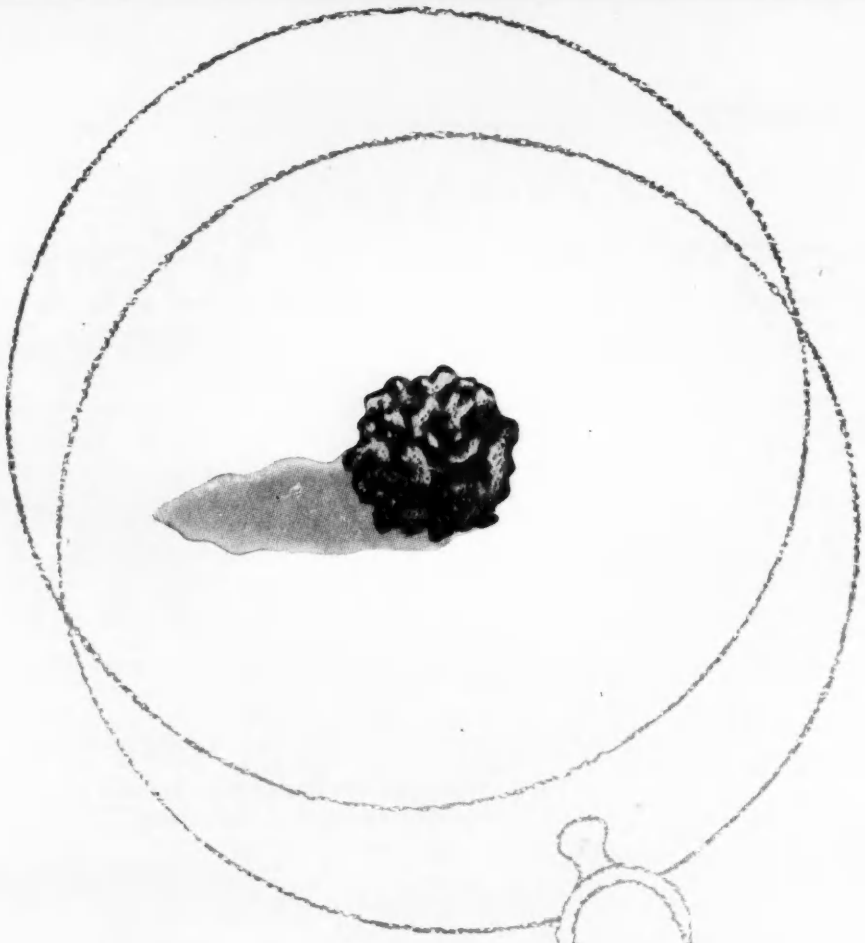

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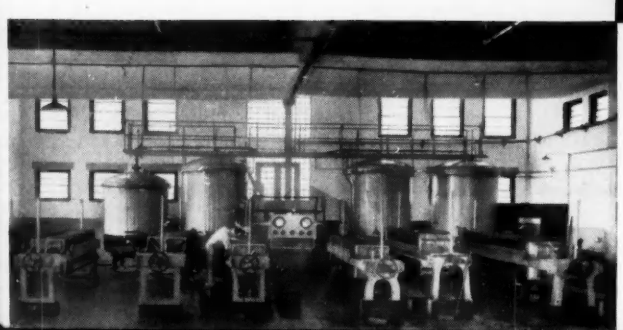

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General Technical Session—

RECENT RESULTS OF TEXTILE RESEARCH INSTITUTE AND TEXTILE FOUNDATION RESEARCH*

J. H. DILLON

Director of Research,
Textile Research Institute, Inc. and The Textile Foundation, Princeton, N. J.

Abstract

The introduction of this paper includes a brief account of the growth of staff and laboratory facilities of two cooperating organizations, the Textile Research Institute, Inc. and The Textile Foundation. It is pointed out that their common objective, "fundamental textile research", is unique inasmuch as it incorporates the major principles of a sound academic or "pure research" attack, but provides selection of research assignments with definite practical significance with regard to textile mill operations. An important feature of the program is the inclusion of the graduate training of chemists, physicists and engineers with textile research backgrounds. An unusual but very satisfactory cooperative arrangement with Princeton University has made this program possible. In general, it is asserted that this form of attack produces an optimum basic research output per dollar expended in the present, applied textile research and textile research men for the future. Methods for transmission and interpretation of research results to practical mill men are outlined.

In accord with the policy of selecting research programs in fields of practical textile interest, the general regions of present assignments are given. These include: the structural properties of fibers as related to processing and fabric quality, the molecular nature of fibrous materials such as cellulose, wool, and nylon with relation to their performance in yarns and fabrics, the mechanism of dyeing, infrared optics of textiles, dimensional stability, rapid measurement of moisture in bulk fiber and fabrics, warp sizing fundamentals, measurement of physical parameters in textile operations (such as tension in yarns on a spinning frame), and investigation of fiber damage during processing and its reduction. Significant results obtained in each of these fields are presented, and their long-range practical application is indicated.

Introduction

IT is always a pleasant privilege for me to speak before the A.A.T.C.C., particularly because of the concomitant growth and common interests of this organization and those of the two which I represent—Textile Research Institute and The Textile Foundation. The objectives of all three organizations are basically the same—to advance the American textile industry and allied branches by research, education and publication. Yet, the avenues chosen for the attainment of these ideals were somewhat different—the A.A.T.C.C. embarking on a program of applied research carried out largely by committees of capable scientists within their own industrial laboratories and by Dr. Stiegler's able A.A.T.C.C. research staff at Lowell, which also serves as a correlating agency; T.R.I. and The Foundation adopting the "fundamental research" approach with the work done by a special staff in a central laboratory. The term "applied reesarch" was dropped by T.R.I. some time ago simply because it was considered superfluous and sometimes misleading. All the "fundamental research" of T.R.I. and The Foundation is aimed at eventual practical application based upon the broad knowledge of scientific principles gained by the longer-range form of attack. On the other hand, the fundamental research method has been employed effectively many times by A.A.T.C.C. in achieving its more specific applied aims.

In regard to education, objectives are again similar, but methods differ among the three organizations. A.A.T.C.C. has employed student memberships and fellowships in various textile schools in an effort to produce textile experts trained essentially at the bachelor's level, while T.R.I. and The Foundation function cooperatively with Princeton University in the graduate training of chemists, physicists and engineers in textile research.

Finally, the publications of A.A.T.C.C. and the T.R.I.-Foundation combination are both aimed at dissemination of scientific knowledge for the stimulation of research in the common field of interest, but the *American Dyestuff Reporter* leans toward papers dealing with a more directly applied type of work as compared to those published in *Textile Research Journal*. The A.A.T.C.C. *Year Book*, of course, is a very important contribution serving as a sort of bible for textile chemists and dyers all over the world.

The foregoing comparisons might seem rather elementary and obvious to many of us; yet, I think it important to point out similarities of objective and the different non-overlapping methods chosen by A.A.T.C.C., on the one hand, and T.R.I. and The Foundation on the other, in order to consider the possible benefits of inter-organization cooperation. In particular, it appears possible that practical application of the results of our present Institute project on the fundamentals of the dyeing process might well be carried out by A.A.T.C.C. In fact, I have been assured that A.A.T.C.C. would welcome this opportunity to cooperate with T.R.I., a situation which is encouraging and which exemplifies the complementary functions of the two organizations.

* Presented at the General Technical Session, Atlantic City Convention, October 13, 1949.

General Status of the Institute-Foundation Research Organization

The past few months have been a trying period for the textile industry and, of course, for textile research organizations. With textile sales and production greatly reduced, there has been a natural tendency on the part of mill executives to re-examine research expenditures both within their own organizations and those made for work carried out in industry-sponsored laboratories such as that of T.R.I. In general, research directors have had to demonstrate the soundness of their programs, economy of their operations, and the practical significance of the results obtained. It seems appropriate at this time, therefore, for me to render a report on the Textile Research Institute and The Textile Foundation organizations, programs and results since many of you represent companies actively supporting the Institute. I believe that most of you, as A.A.T.C.C. members, have an interest in our progress. Those of you who are not intimately familiar with our work may welcome some background information. Hence, this report will include a very brief account of our organization and equipment as well as an outline of our program and some of its results, highlighted.

At the outset, I am happy to say that our organization seems to have weathered the storm—at least thus far. During the past three years, we have consistently carried on the important business of equipping our Princeton laboratories and acquiring a staff within a budget which has been limited, but with growing interest in our work, has also been increasing. In fact, during the past three years our combined Institute-Foundation research fund has about doubled while the Institute's research expenditures have actually tripled. During the past critical eight months we have held our own in net industry support and have been able to continue the program of equipping and staffing our Princeton laboratories without serious discontinuity.

The Research Staff

At this moment, I am happy to say that the critical three-year task of staff building has been completed, at least to the point where we can make an adequate attack on our present program. If our program expands, we shall have to acquire more laboratory space and further increase our staff. I do not hesitate to say that the Institute and The Foundation have some reason to be proud of this staff which makes up in quality what it may lack in numbers.

The permanent staff consists of twelve full-time scientists and four Princeton University professors, plus a small but effective group of technicians, maintenance and administrative personnel. This permanent staff, together with our fifteen Research Fellows (all save one of whom are graduate students at Princeton†) must carry the full burden of our rather ambitious research program. The whole group numbers some forty-six people; it cannot grow much beyond fifty within our present quarters.

Laboratories and Equipment

Many of you have visited our laboratories on the shores of Lake Carnegie just outside the boro limits of Princeton, N. J. If you have not visited us within the last year, I hope that you will shortly. You will be amazed at how perfectly adapted for conversion to a research laboratory was this old stone building, (originally a twenty-room dwelling) with its three concrete floors, concrete stairways, tile partitions and numerous chimneys located at convenient points to serve as exhaust vents for chemical fume hoods. Every nook and cranny of the building is now in use, unless there be some secret passages still undiscovered. At present it provides fourteen fully equipped laboratories for chemical, physical and engineering research, a large library, conference room, carpentry and machine shops, storage facilities, adequate building-equipment rooms and administrative offices. Five of the laboratories are air-conditioned, two completely temperature and humidity-controlled and the other three temperature-controlled but with humidity-maximum control. In addition to the usual chemical and physical apparatus, our equipment list includes a recording infrared spectrometer, an x-ray diffraction unit equipped with a Geiger counter, an indicating spectrophotometer, microbalance, two Instron tensile testers, the original T.R.I. fiber tester, an osmometer, centrifuges (no ultra-centrifuge, unfortunately) and excellent microscopic and photomicrographic equipment. We do not yet have a recording spectrophotometer nor an electron microscope, both of which we need but cannot yet afford—(prospective donors please note). It is also important to note that we have access to the libraries, shops and other facilities of Princeton University. Surrounding our laboratory is a thirty-acre tract which certainly provides for future expansion of T.R.I., and perhaps also for other research organizations who may wish to locate nearby. Possibly A.A.T.C.C. might some day wish to become our neighbor.

Research Policies

The research policies of the Institute and The Foundation are practically identical. In brief, only long-range fundamental research of general value to the whole textile industry and allied branches is undertaken. This "fundamental research" differs from that ordinarily carried out in university laboratories (let us, for convenience, refer to this latter as "academic research") only in that no fundamental research problem is attempted in our laboratories without first ascertaining that the results must be related to an important practical problem or class of problems in the textile industry. An "academic research" problem, of course, is usually chosen only on the basis of pure scientific interest. The choice of our research problems is ordinarily made by the respective research advisory committees of the Institute and The Foundation, in consultation with their director of research. Since the majority of individuals constituting these committees are practical textile men representing all major branches of the industry, there is little danger of neglecting the eventual application significance in problem assignment, or of confining the program to a single type of fiber. The presence of recognized academic research scientists on the committees, however, results in breadth of program and originality of attack. The so-called "general programs" of the Institute and The Foundation are thus designed to provide a maximum of useful data for all the major branches of the industry.

When a group of T.R.I. members from a certain branch of the industry decides that additional concentration in a field of their particular interest is needed, a special project is set up which they may support with funds over and above their regular T.R.I. dues. At times another organization, such as the International Wool Secretariat, The American Wool Council, or a government agency, joins in the support of a special project. In certain cases, government agencies, such as the Office of Naval Research or the Quartermaster Corps, sponsor special separate fundamental research projects. The fact remains, however, that neither the Institute nor The Foundation ever does "private research" for a single textile firm, no matter what its past contribution may have been, or the contemplated support may be, to the Institute. There is no mechanism by which a firm can support The Foundation, of course. It is a cor-

† The Institute and The Foundation sponsor the Henry Eyring Fellowship at the University of Utah.

poration chartered by act of Congress to conduct scientific and economic research —not support it—for the benefit of the textile industry and allied branches, thus expending an initially fixed fund at a rate determined by its directors, and which will empty its treasury within three or four years from this date. The Foundation and the Institute must, therefore, be recognized as entirely separate, but closely cooperating, organizations.

The Research Program

The Institute-Foundation program is depicted in the chart of Figure 1. At first glance, this may appear to be simply an organization chart; in fact, it is a combined organization-assignment diagram. I present our program in this manner simply because I feel that problem assignment is a matter which is impossible to separate from the personnel available to carry it out. It will be noted that the organization is roughly broken up into fields of science or divisions entitled: Physical Chemistry, Organic Chemistry, Physical-Organic Chemistry, etc. Within each division or field is at least one group, usually headed by a group leader who may be rated as a Section Head if he is a full-time Institute or Foundation scientist, or an Assistant Director or Consultant, depending on the portion of his time spent in our laboratories, if he is a Princeton faculty member. The personnel in a given section is clearly shown to fall into three classes: full-time scientists, technicians and Research Fellows. Below each section in the chart are shown the principal present assignments. At the bottom of the chart are shown the various Institute and Foundation "Special Projects" which provide additional support for the portions of the program indicated. Other parts of the program are supported by general Institute and Foundation funds; these two types of support are not distinguished in the chart for the sake of simplicity. The level of training of each scientist can be obtained from the chart by noting the type of rectangle enclosing his name.

Obviously, no single chart, however complicated, could show the ultimate practical objects of each fundamental research assignment. To accomplish this aim, it would be necessary to show many charts; I shall give a few representative diagrams, and your imagination can supply the others.

Research Assignments as Related to Practical Problems

It has already been emphasized that our first step in assigning a fundamental research problem is the selection of a field of research which is related to a

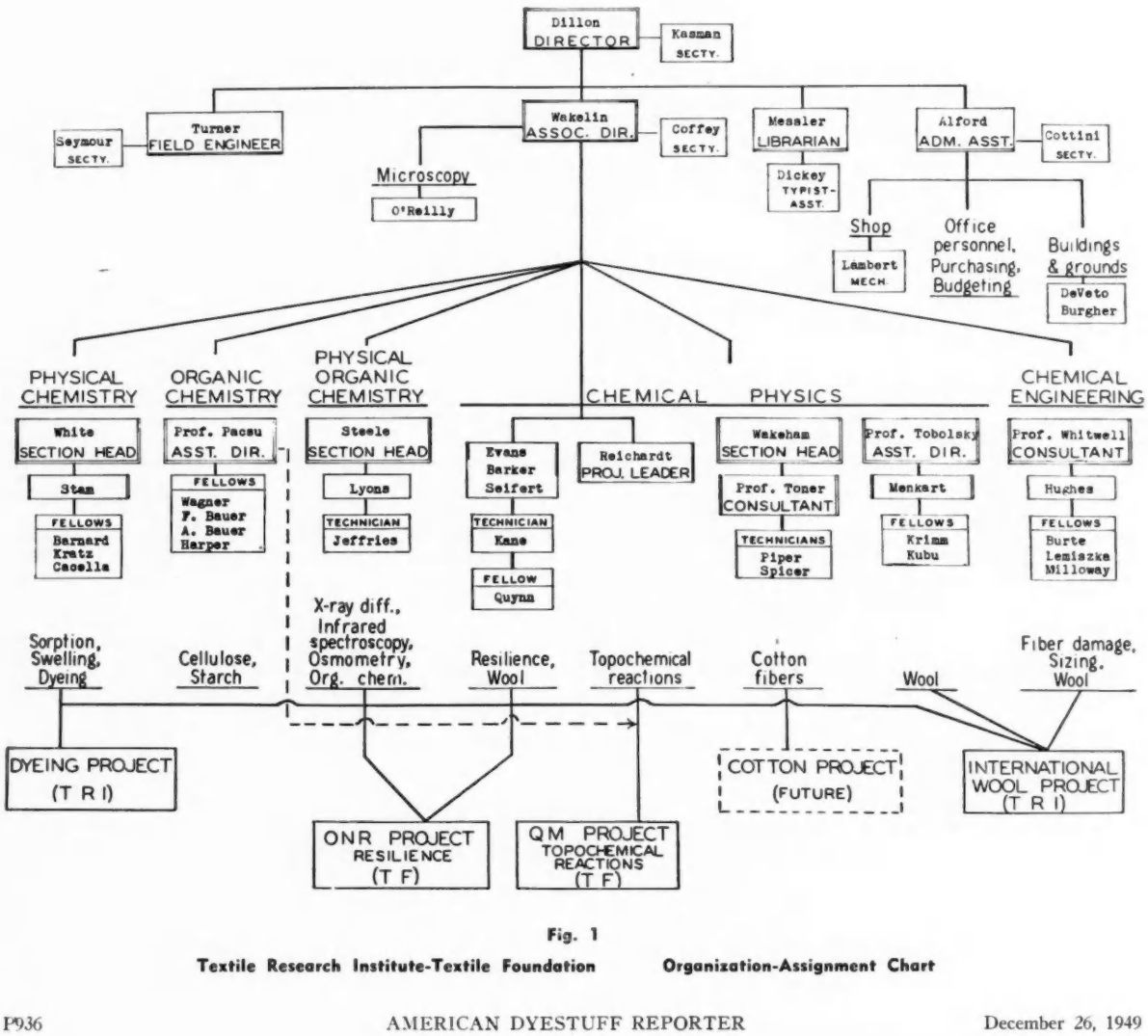

Fig. 1

Textile Research Institute-Textile Foundation Organization-Assignment Chart

major practical textile problem or area of problems. Suppose we now scan the present program of the Institute and The Foundation in some detail as it relates to practical problems. Space does not permit a complete analysis of this type, but eight representative assignments with the major practical problems upon which they are based are tabulated in Tables I to VII.

TABLE I

Assignment: Organic chemical studies of cellulose structure.

PRACTICAL PROBLEMS DICTATING ASSIGNMENT:

1. Chemical stabilization of cellulosic fibers.
2. Increased laundry life of fabrics.
3. Improved crease-resistant fabrics.
4. Development of soluble celluloses.
5. Improved flame resistance.
6. Improvements in alkali-cellulose aging process in viscose manufacture.

In Table I, the major assignment of Professor Pascu's group—organic chemical studies of cellulose structure—is analyzed for practical significance. This fundamental study is essentially an investigation of the mechanisms of hydrolytic and oxidative breakdown of various types of cellulose—cotton, bast fibers, regenerated, etc. It has led to quite a different concept of cellulose structure *(1)* which, while not yet accepted by many, has stimulated much valuable work in the cellulose field. As the work progresses, obviously it offers possibilities for stabilization of cellulose (items 1 and 2) against degradation in both acid and alkali media simply through greater knowledge of the mechanisms of degradation. Professor Pacsu's program, coupled with that of Professor Whitwell on fiber damage in processing, has a possibility of increasing the laundry life of cotton, but this will be discussed in connection with Table IV. One of the sub-assignments in Pacsu's program is the study of the nature of crosslinking in cellulose, which obviously points to Problem 3. A method of crosslinking cotton cellulose by a vapor phase reaction has been devised which appears to have valuable potential in minimizing the loss of strength of cotton occurring during the reaction. This result will not depend entirely upon the use of a vapor phase technique which, upon preliminary consideration, does not itself appear practical. It is unnecessary to expand on Problems 4 and 5 since their solutions will obviously be facilitated by a more complete knowledge of cellulose structure. Problem 6, however, seems to have more direct significance since several Institute member firms are known to be making pilot plant studies of the reduction of D.P. of cellulose to the proper level for spinning by weak acid hydrolysis rather than by the customary air aging of alkali cellulose. The acid method, if successful, would be more economical in material and literally save acres of plant floor space. We must wait, of course, for the pilot plant results before classing the new process as an outgrowth of Pacsu's fundamental work. We can state, however, that an acceptable textile rayon has been made on a small scale using the acid method of aging.

TABLE II

Assignment: Sorption and swelling of single fibers.

PRACTICAL PROBLEMS DICTATING ASSIGNMENT:

1. Dimensional stability of fabrics with variable moisture.
2. Improved hygrometer elements.
3. Improvement of wet fiber properties.
4. Improvements in dyeing processes.

The assignment of Table II, sorption and swelling of single fibers, is obviously related to the practical problems of dimensional stability of fabrics (Problem 1), inasmuch as the results included the effect of tension upon diametral and longitudinal swelling. It is true that the work to date *(2, 3)* has been done only on single fibers, and extension of the studies to work on yarns would be the next step in predicting fabric distortion with changing humidity or in applying the results to mill operations. Development of a hygrometer element (Problem 2) with increased magnitude and rapidity of response, and with low hysteresis obviously follows from this assignment. In fact, the early part of the work on swelling was sponsored by the Signal Corps with this specific end in view, and our work resulted in the finding that a nylon film with a special treatment has considerable promise as compared to the commonly used human hair or goldbeaters skin elements. The improvement of wet fiber properties (Problem 3) follows naturally from the assignment, although it is a difficult problem and demands work in several other fields. Probably the most important result of our sorption and swelling work was the accumulation of basic data and a reasonable understanding of the physical-chemical phenomena which could be applied to our present research on dyeing; more on that later. The sorption-swelling results are also of great value in connection with our studies of wool fibers, although the keratin fiber studied was human hair.

TABLE III

Assignment: Mechanical properties of fibers and yarns.

PRACTICAL PROBLEMS DICTATING ASSIGNMENT:

1. Improvement of existing fibers.
2. Development of new or modified fibers.
3. New test methods and apparatus.
4. Increased utilization of medium wools.
5. Improvements in textile processes.

The assignment on the mechanical properties of fibers and yarns (Table III) has received rather extensive attack in our laboratories from the early work of Lederman *(4)*, through the studies of Eyring and coworkers *(5)*, and to the more recent multistate theory of Burte and Halsey *(6)*. Many of the papers in the series describing this work were highly mathematical, and some practical textile men have found it hard to realize that this work was aimed at Problem 1, the improvement of existing fibers, or Problem 2, the development of new fibers. Yet, these aims are clearly related to the assignment on the reasonable premise that a more complete knowledge of fiber molecular structure must make possible these practical developments. In fact, judging by the interest in the Burte-Halsey work which I found among scientists in the various laboratories in England and the continent, our results on mechanical properties of single fibers are already being used effectively. Progress has been made in the development of new test methods and apparatus (Problem 3). In fact, the T.R.I. Fiber Tester, developed by Institute Fellow, C. H. Reichardt *(7)* appears to remove most of the objectionable features of previous fiber testers and may be the prototype of a whole new family of tensile testers for fibers, yarns and fabrics employing the differential transformer dynamometer as a stress measuring element. Problems 4 and 5 are of long range, of course, but nevertheless the mechanical properties background made possible our present, more direct attack, particularly on wool. Some of the more significant results on wool will be discussed later in some detail.

TABLE IV

Assignment: Fiber damage studies.

PRACTICAL PROBLEMS DICTATING ASSIGNMENTS:

1. Localization and reduction of dry-processing damage.
2. Reduction of wet-processing damage.
3. Reduction of drying damage.

The assignment on fiber damage studies has obvious practical applications (Table IV). Since the fiber damage work will be discussed later in detail, no further discussion is needed at this point.

TABLE V

Assignments: Organic chemical studies of starch and the fundamentals of sizing.

PRACTICAL PROBLEMS DICTATING ASSIGNMENTS:

1. Improvements in sizing process.
2. Greater uniformity of starch sizes.
3. Stabilization of starch sizes.
4. Development of starch derivative films and fibers.

The presentation of Table V differs slightly from the others since it involves two closely related assignments—organic chemical studies of starch by Professor

Pacsu's group, and a study of the fundamentals of sizing by Professor Whitwell's group. The progress of this work has been rather slow to date because of difficulty in defining the sizing problem for laboratory investigation. There has also been a paucity of personnel to carry out this work. However, progress has been made by Professor Pacsu in gaining more knowledge of starch structure and degradation and Professor Whitwell's small group seems now to be on the way to some interesting conclusions on the sizing operation. The relation between assignment and practical problems is obvious in this case, and further discussion is unnecessary.

TABLE VI

Assignment: Moisture measurement.
PRACTICAL PROBLEMS DICTATING ASSIGNMENTS:

1. Rapid and precise moisture measurement in bulk fiber and fabric.
2. Production moisture control.
3. Improved laboratory methods of moisture measurement.

The assignment on moisture measurement (Table VI) is probably the most directly applied of our fundamental research problems. It is included to show a completed assignment with all practical objectives already achieved in some degree—quite a novelty in any laboratory. This work was initiated by the need for information on the various electrical moisture meters which were thrown upon the market a few years ago. First of all, we selected for study two electrical meters: the Hart, which is a D. C. instrument and can be used for either fabric or bulk fiber, and the Steinlite, an A. C. meter which is used only for bulk fiber measurement. We then made a careful comparison of each instrument against oven moisture measurement as a standard, employing statistical analysis to estimate the precision of the results. When properly used and with the results correctly interpreted, each of these meters was found to be as good as the standard oven method and much more rapid for several types of fibers. Calibration for each type of bulk fiber is necessary, of course. In addition, we have studied the Moisture Register and the Fielden Drimeter.

As a side line on this work, the Karl Fischer chemical method of moisture measurement was investigated and somewhat simplified for textile work. All of the moisture work has been written up for publication and has appeared *(8)*, or will appear shortly, in *Textile Research Journal*. We feel quite justified in our decision to carry out this work in a careful manner, on the basis of the many reports from mills which have found the data useful. It should be remembered that Institute members can obtain results prior to publication by informal discussions in our laboratories and from our progress reports to members known as "Notes on Research".

Research on the Fundamentals of Dyeing

The last of this series of tabulations (Table VII) deals with our program on the fundamentals of dyeing. This Special Project, supported by a group of rayon manufacturers, dyers and finishers and dyestuff companies, was initiated in July 1948. Because dyeing is one of the principal interests of A.A.T.C.C., this project will be discussed in some detail. The Project was originated with the simple objective of obtaining a better understanding of the basic physical chemistry of dyeing phenomena. Previous work on sorption and swelling of single fibers *(2, 3)* by Messrs. White and Stam of our staff provided a foundation for the research on dyeing. Project funds made possible setting up and partially equipping a special dyeing laboratory on the third floor of our building, and work started about July 1, 1948.

TABLE VII

Assignment: Fundamentals of dyeing.
PRACTICAL PROBLEMS DICTATING ASSIGNMENTS:

1. Chemical systemization of dyeing process.
2. Improvements in dyeing process.
3. More level dyeing.
4. Reduction of fading and crocking.
5. New methods of dyeing hydrophobic fibers.
6. Methods for measuring dye absorption.
7. Methods for measurement of crocking.
8. Improved dyestuffs.

The general mode of attack chosen for the dyeing research is to obtain the basic chemical and physical data pertinent to dyeing equilibria and rate phenomena such as swelling, sorption of dye and salt ions, dye and salt ion concentration in the bath, fiber tension and temperature. Given these basic experimental quantities, our theoretical physical chemists are quite capable of employing the basic principles of thermodynamics and rate theory to explain the mechanism of dyeing. All work is to be done on single fibers or films in order to avoid liquor entrapment and to permit direct microscopic measurement of swelling. It is recognized that the use of single fibers creates problems in the measurement of absorbed dye and salt ions. Furthermore, when appreciable longitudinal swelling occurs, the swelling studies are limited, at present, to fibers of reasonably round and uniform section such as human hair, nylon, and specially prepared regenerated cellulose and cellulose acetate fibers. Practical experts on dyeing might object to our insistence that equilibrium studies be made as well as rate experiments since practical dyeing is seldom, if ever, carried out to equilibrium. Nevertheless, if we are to employ thermodynamic reasoning, we must measure the principal variables at equilibrium. In a further attempt to simplify the initial experiments, we depart again from the reality of the dyehouse by employing large volumes of dye bath in respect to fiber volume so that the depletion of dye and salt ions in the bath will be negligible, i.e., the "long dye bath" will be of fixed concentration during a single experiment.

There has been some excellent work done on the fundamentals of dyeing in England and this country, but in few cases have the workers employed single fibers for their studies, nor have they measured swelling of the fibers in the bath. In fact, in several otherwise excellent researches, the magnitude of swelling has simply been assumed or treated as a disposable parameter. We feel that swelling is an important variable which should be accurately measured. But, having decided upon these rather idealized experimental conditions, how can the difficulties induced by their choice be met?

First of all, we have the techniques of swelling measurement quite well in hand. The dye bath is simply circulated through a small cell with parallel glass walls and the fiber diameter measured at 10 to 20 points along the fiber. The rapidity of diameter measurement may be greatly increased by taking several photomicrographs in quick succession, making the actual measurements on the film later and at leisure. Proper selection of indices of refraction of fiber and bath must be made, of course, but this has not proved difficult. In our latest experimental arrangement, the fiber is mounted in an extremely light jig under a known spring tension which can be varied. The jig can be removed easily and quickly from the cell. In general, another somewhat longer section of the fiber is immersed in the bath. This longer section can be removed and weighed on the microbalance, after bringing the fiber to a standard moisture content.

Now, thus far, the techniques are straightforward, and we are fairly well satisfied with the precision which we obtain. However, the weighing process yields only the sum of the non-volatile materials absorbed by the fiber. The obvious answer to this problem was to attempt the use of radioactive tracer elements to tag the dye molecule and salt ion. It now appears that the tracer technique has a good possibility of success. Initially, we are attempting to tag the dye molecule with 87-day sulfur S^{35} by sulfonating the dyestuff intermediates with active sulfuric acid. Active sodium Na^{22}, with a half life of three years,

seems a good possibility for tagging the salt. Preliminary calculations of beta-particle absorption indicate a maximum loss of 50% within the coarsest fibers for which a simple correction can be made. Removing the jig from the cell should make possible reliable beta counts. The total beta count, of course, would indicate the sum of dye molecules and salt ions present in the fiber. However, utilizing the difference in velocities of the two groups of beta-particles by a conventional foil absorption technique, it should be possible to measure individually the amounts of dye and salt present in the fiber in a single experiment (a 2/1 ratio of beta-particle energies being adequate for distinction). In fact, we may be able to measure individually the amount of three tagged substances absorbed where one of the tags (for example, Na^{22}) is a gamma radiator. We have been most fortunate in securing the cooperation of Brookhaven National Laboratory in developing this application of radioactive tracers, and one of our staff members is working full time in the well-equipped laboratories at Brookhaven on Long Island. This procedure was made possible by the fact that we are attacking the problem from the fundamental research viewpoint. Naturally, we should make much more rapid progress with this arrangement than we could starting from scratch in our own laboratories since we have not only the complete equipment of Brookhaven at our disposal, but also have their background of experience and active participation in the work.

I regret very much that I am not yet able to present quantitative results on the radioactive tracer technique applied to dyeing studies, but I am happy to announce the preparation of, as far as we know, the first radioactive dyestuff for textile application—reported to me by our Mr. Stam. It is the wool acid dye, with du Pont name—Anthraquinone Blue S K Y, tagged with S^{35}. However, I did wish to present our program to you, and I hope you will not hesitate to comment frankly upon it. I feel that the program is, in general, well designed. It is guaranteed for an exploratory period of five years, which is none too long. We have excellent support from the rayon manufacturing industry, $25,000 of the total $30,000 per year, in spite of our insistence that we not be limited to any one fiber or type of fiber. It does seem a bit strange that the American dyestuffs manufacturers, dyers and finishers together have been interested only to the extent of $5,000 per year. We originally set our sights at a total of $60,000 per year, but after several conferences with dyestuffs manufacturers', dyers' and finishers' technical representatives, where great enthusiasm for the project was shown but which yielded very little actual support, we decided that it would be unfair to our enthusiastic initial sponsors to delay longer in starting the work. I frankly admit, of course, that I was able to contact only a small part of the finishing industry; after all, a research director has a few other things to do besides promoting financial support for the work of his group. In any event, I am glad that we did start on this modest basis. Whether or not we gain additional support as we go along, we *are* going to continue, and I rather suspect that we shall turn out a creditable job. If we do gain the additional support we need, it will make possible acquisition of very badly needed equipment and a modest staff increase. The Dyeing Project is typical of many research efforts in that the doubling of our support at this stage could quadruple our research output. Equally to be desired are small annual amounts—$200 to $500—from the smaller units of the industry, as compared to larger amounts from a relatively smaller number of major firms; $200 per year from 150 small firms buys just as much research as $2,000 per year from 15 major companies. The Dyeing Project is of industry-wide importance and deserves industry-wide support.

With no apologies whatsoever for injecting this appeal for support into a factual scientific discussion, let us consider the long-range, practical significance of the work. I don't think that any of the practical problems listed in Table VII can be considered remote from the spirit of the assignment. Items 6 and 7 do require a little imagination, but when the possibilities for quick and simple measurement of dye absorption, crocking, etc. in production by radioactive tracer methods are considered, it seems almost certain that real practical value resides in the dyeing assignment. The probability of successful application approaches unity when the possible role of A.A.T.C.C. in the final stages is considered.

Some Recent Research Findings

Thus far I have skimmed very quickly over our program, barely mentioning a few of our more significant results. Other completed programs, such as our infrared drying and transmission work with its unexpected importance from the standpoint of night military operations, could be described. Some of our newer projects, which include a most promising method of measuring yarn tensions on the spinning frame, would be of interest, however, a report at this time would be premature. There are several outstanding results which merit description and I shall have space to mention only a few.

DAMAGE TO COTTON IN MECHANICAL PROCESSING.—Some will recall that, about three years ago, Professor Whitwell began a study of fiber damage. Logically enough, the work started with a study of methods of characterizing quality of a fiber material; cotton cellulose was the first material chosen. After a careful perusal of the literature, we selected the cupriethylene diamine viscosity technique as the most promising way of measuring the degree of polymerization (D.P.) of cellulose. We realized, of course, that there is no reliable calibration of the intrinsic viscosity of cupriethylene diamine solutions of cellulose in terms of molecular weight or D.P. However, we were interested in changes in D.P.—not absolute values—so intrinsic viscosity of cellulose in cupriethylene diamine solution seemed to be a promising quality index. Soon after we started the experimental work, however, we encountered troubles in the higher D. P. range, such as non-Newtonian behavior and oxidative degradation of the cellulose in solution. These difficulties were minor when the method was used in the lower range of D.P.'s, i.e., for viscose rayon. Then ensued a concentrated effort to remove the difficulties. Finally, Dr. James Krieble, then an Institute Fellow working with Professor Whitwell, devised a means of excluding oxygen at the critical stage of the process and thus eliminated a serious obstacle to the proper use of the viscosity technique. He then observed that his solutions, while distinctly non-Newtonian, still yielded a linear log-log relationship between shearing stress and rate of shear (i.e., the rate of shear was proportional to the shear stress raised to a power Z, "Z" being constant for a given solution). Using this experimental result, which is not at all uncommon with polymer solutions, he derived a quantity termed the "viscosity counterpart" (defined as "ξ" in the expression $du/dR = (1/\xi)S^Z$, where du/dR is the rate of sheer and S the sheer stress) in terms of measurable quantities—pressure drop, tube dimensions and volume rate of flow. He then set up a ratio of "viscosity counterpart" (ξ) to the corresponding Newtonian viscosity η_o. The quantity $(\xi/\eta_o - 1)/c$, where "c" is the concentration, was then set up and "c" allowed to approach zero, whereupon "Z" approached unity and the disturbing unphysical dimensions of "ξ" disappeared. The result was an unambiguous value of the intrinsic viscosity which, of course, is defined only in the limiting case of

zero concentration. This work has already been reported *(9)*. The result is extremely useful for work with solutions of the many high polymers which yield the linear relation between the logarithms of rate of shear and shearing stress. As far as our work was concerned, two years of careful research yielded not only a technique for preventing decay of native cellulose in cupriethylene diamine solution, but a method of calculating the desired quality index, the intrinsic viscosity.

Once this long period of fundamental work was over, it was relatively easy to begin the next stage of the program—to determine processing damage to cotton. The first cotton samples examined were taken from various stages of processing in a small-scale mill at Clemson Agricultural College (Empire cotton). After careful statistical treatment of the intrinsic viscosity data, a surprising and important fact was apparent—there was a 30 percent overall reduction in D. P. of the cotton cellulose from bale to yarn, which apparently resulted from mechanical processing. The results are shown graphically in Figure 2, taken from Krieble's and Whitwell's recent paper *(10)*. An almost identical result was obtained with Stoneville cotton processed at the Southern Regional Research Laboratory of the U. S. Department of Agriculture.

At first it was thought that this unexpectedly large reduction in D. P., i.e., chemical damage, caused by mechanical processing might be thermal degradation resulting from local high temperatures which could occur in the fibers during processing. Application of the Congo red test of Clegg *(11)*, however, did not indicate thermal damage to the fibers. Hence, we are forced to conclude that the localized stresses encountered in mechanical processing of cotton are sometimes great enough to rupture cellulose chains. This is an interesting scientific result with obvious great practical importance, especially since we have just found a corresponding reduction of about 5 per cent in Pressley tensile strength due to processing.

With a sound method of measuring processing damage and a knowledge of the extent of damage, the next step is obvious: attempting to localize the damage within one or more operations of processing. When that is done, textile machinery manufacturers must go to bat (already we have evidence of their desire to do so) and improve their equipment. Finally, it would seem possible to produce, with no increase in materials cost, a better cotton fabric with longer laundry life expectancy, since it would begin its fabric career with a higher molecular weight and would have a "head start", so to speak. The history of this project constitutes an excellent "start-to-finish" example of the possibilities of fundamental textile research for benefitting a whole group of mills, large and small; in this case it is the cotton industry. Please bear in mind that the most difficult part of the job was done by a single Princeton graduate student, an Institute Fellow, working with a capable senior scientist. Perhaps I can be excused for some enthusiasm for our system of graduate education as a way of doing research in the present while training research men for the future.

GENERAL RELATIONS:

$$F = k_2 l + \frac{1}{\alpha}\sinh^{-1}\left(\frac{\dot{l}'}{K}\right) = k_2 l + K_1 l_1$$

$$\dot{l} = \frac{1}{K_1}\dot{f} + K\sinh\alpha f$$

RELAXATION: ($\dot{l}$ = const.)

$$F = l\left\{K_2 + \frac{2}{\alpha l}\tanh^{-1}\left[\tanh\left(\frac{\alpha K_1 l}{2}\right)e^{-\alpha K K_1 t}\right]\right\}$$

CREEP: (F = const.)

$$l = \frac{F}{K_2}\left\{1 - \frac{2}{\alpha F}\tanh^{-1}\left[\tanh\left(\frac{\alpha K_1 F}{2(K_1+K_2)}\right)e^{-\frac{\alpha K K_1 K_2}{K_1+K_2}t}\right]\right\}$$

CONSTANT RATE OF STRAIN: ($\beta = P/K$ = const.)

$$F = K_2 l + \frac{1}{\alpha}\ln\left\{\beta + \sqrt{1+\beta^2}\tanh\left[\frac{\sqrt{1+\beta^2}}{2\beta}\alpha K_1 l + \tanh^{-1}\frac{1-\beta}{\sqrt{1+\beta^2}}\right]\right\}$$ Extension

$$F = K_2 l + \frac{1}{\alpha}\ln\left\{-\beta + \sqrt{1+\beta^2}\tanh\left[\frac{\sqrt{1+\beta^2}}{2\beta}\alpha K_1 (l_m - l) + \tanh^{-1}\left(\frac{e^{\alpha(F_m - K_2 l_m)}}{\sqrt{1+\beta^2}} + \beta\right)\right]\right\}$$ Retraction

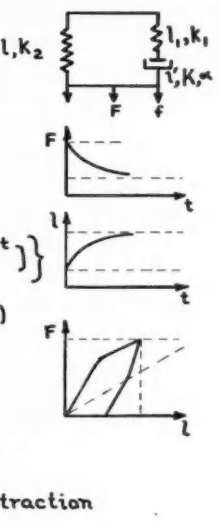

Fig. 3

Eyring Three-Element Model

F = total stress on the fiber
f = stress on Maxwell element
l = $l_1 + l'$ = elongation of fiber
$\dot{l}$ = rate of elongation
α and K = Eyring viscous constants
β = $\dot{l}$ K when $\dot{l}$ is constant
K_1 and K_2 = spring constants

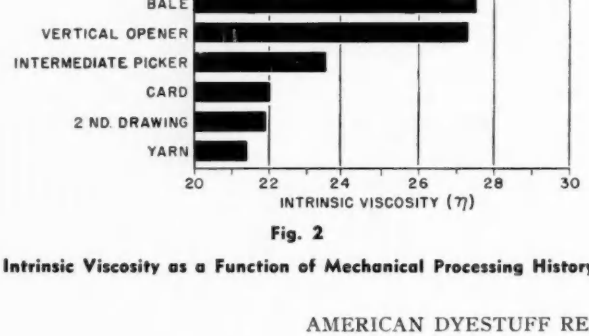

Fig. 2

Intrinsic Viscosity as a Function of Mechanical Processing History

RECENT RESULTS OF WOOL FIBER RESEARCH.—Another important "Special Project" on the Institute's program is the "International Wool Project." It is supported on a four-year basis by a group of American wool manufacturers, The Wool Bureau, Inc., (representing American wool growers as well as the International Wool Secretariat's interests in this country), the U. S. Department of Agriculture and the Boston Wool Trades. The fundamental research objective of this work is the acquisition of chemical, physical and morphological information on wool fibers of various types,

grades and from samples taken at various stages of processing. The "ultimate application hope" of the work is that it may eventually make possible a greater utilization of medium wool fibers by chemical modification and/or changes in wool processing. This rather extensive program evolved quite naturally on the basis of our background on fiber structure and behavior, acquired during a period when the work was done with general Institute and Foundation funds, enhanced by research contracts with the Quartermaster Corps of the Office of Naval Research.

The theoretical work of Eyring *(12)*, even in its simplest form—the three-element model (see Figure 3)—constituted a considerable advance in our understanding of fiber behavior. It explained quantitatively the stress-strain-time relationships found for acetate fibers. The Eyring theory was modified by Halsey, White and others, so as to account for the more complicated behavior of other fibers such as viscose rayon. Finally, the multistate theory of Burte and Halsey *(6)* was developed and found to be capable of predicting, qualitatively at least, the repeated stress-strain behavior of wool fibers. In some cases quantitative agreement was found, as illustrated in Figure 4, for a single cycle of extension and retraction of a wool fiber. The Burte-Halsey concept of fiber behavior still appears superior to other theories, and the principles discovered in the course of its development have great potential importance. However, it yields rather complicated expressions and is much too cumbersome and complicated for routine use in describing fiber properties. In an effort to obtain a simple parameter for indicating changes in properties induced by chemical and physical treatments of a given fiber or by differences between fibers, the Hookean modulus, calculated from the slope of the linear portion of the extension curve was selected. This simple and easily measurable quantity is directly related to the "spring constants" employed in the Eyring and Burte-Halsey theories and may be considered to represent the total immediate reaction of the elastic elements of a stressed fiber. That this selection of the Hookean modulus as a fiber behavior index was fortunate will be apparent from a few examples of its use, not yet published, quoted as follows:

Because of the extremely large geometrical variation between wool fibers of a given sample and along a given fiber, it is highly desirable to have a non-destructive test whereby changes in physical properties of an individual fiber can be measured as a function of chemical treatment. The thirty percent index technique used by Milton Harris and J. B. Speakman has proved very useful as a non-destructive method but requires graphical integration and an objectionably long period of soaking in water (several hrs.) before each measurement. Mr. Harris Burte, an Institute Fellow, has found recently that the Hookean modulus can be used very effectively in this connection because a soaking period of only five minutes is required. The measurement and calculation of the modulus is very simple, particularly if the ratio of measured modulus at a given stage of a treatment to the initial modulus is employed, thus eliminating the difficult problem of accurately measuring the fiber diameter. In fact, this "relative modulus" is a dimensionless index which can be measured with considerable precision of about ± 1 percent.

A rather interesting example of the use of this "relative modulus" to measure the effects upon wool fibers of immersion in saturated salt solutions is given in Figure 5. The two lower curves show evidence of two competing processes during immersion. The initial rise of the curve is greater for the lower partial pressures of water vapor over the salt solutions, and it seems reasonable to think that the initial tendency of the fibers to stiffen results simply from dehydration of the initially wet fiber. Simultaneously, however, a second (but slower) process associated with diffusion of salt ions into the molecular network is taking place. This, as might be expected, decreases the "relative modulus" in the later stages of the experiment. The upper curve, obtained with the saturated LiCl solution with a very low partial pressure of water vapor, shows no evidence of the diffusion process although some diffusion undoubtedly took place in the early stages of dehydration before the molecular network was sufficiently de-swollen to forbid further diffusion of the salt ions. Similar behavior has been found in all experiments on salt ion effects, and the results may be explained on the above basis, regardless of whether the fiber is initially wet or dry, or when unsaturated salt solutions are employed. When the initial condition corresponds to a lower partial pressure of water vapor than that above the salt solution, the curve drops initially as hydration occurs and then falls off more slowly during the diffusion controlled process. That this effect is not unique for salt solutions was demonstrated by employing glycerine with differing aqueous dilutions and correspondingly varying partial pressures of water vapor. The same sort of behavior was obtained as with salt solutions with partial pressures equivalent to those of the glyceriane solutions. It should be noted that all three curves of Figure 5 were obtained with the same individual wool fiber, brought back to its initial state by water soaking between experiments. That is, the salt effect is truly reversible. Obviously, this non-destructive technique has definite promise for future work on the chemical modification of wool fibers.

One more example of the usefulness of the Hookean modulus is worthy of mention. Sometime ago, two curled yarns of B. A. wool with an interesting history were studied. One of these yarn samples was taken from a warp which had been stored for about a year before weaving and which behaved very well on the loom when finally woven into fabric. A warp made of supposedly equivalent *unaged* yarn, however, proved impossible to weave without excessive yarn breakage. A very careful study was made of these two yarns and the fibers constituting them. The results are given in Table VIII. Considering first the yarn tests, it is apparent that only small significant differences in breaking strength and breaking extension exist between the two yarns. A very large difference in modulus was found, however, and the aged yarn which wove well was the stiffer of the two, a result which was not anticipated. Turning now to the fiber tests, no significant differences in breaking stress, breaking elongation, or modulus appear. It thus seems that the Hookean modulus of a yarn is a much more sensitive index and somewhat less variant than the conventional quantities—breaking stress and extension. It would be foolhardy, of course, to draw conclusions from these few data concerning the possible casual relationship between high modulus and good weaving. However, this result was so striking that further exploration along these lines must be made. It is quite clear that the Hookean modulus of the yarn is not simply related to the corresponding fiber modulus if both measurements are made in tension. There is a possibility that the two sets of fibers may have quite different bending or torsional moduli, which might be important in controlling the moduli of the yarns in tension. An investigation of this possibility is also on our program. Another interesting fact brought out in several experiments is a distinct correlation between Hookean modulus and breaking load for single wool fibers, but not for yarns—another result which requires more study. In general, as our experimental data accumulate, it is becoming evident that the Hookean modulus of yarns and fibers may be a very important and useful index which has been neglected for many years by textile technologists. If this prediction be realized, the rediscov-

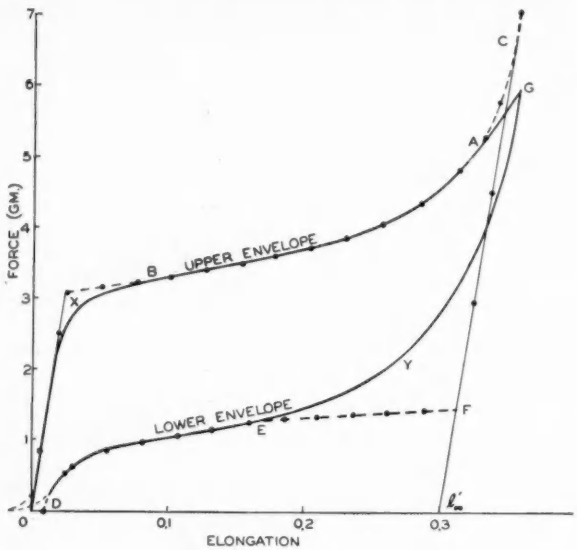

Fig. 4

Stress-Strain Curve for Wool Sample 61, Showing No Secondary Yield Point
Temperature = 70°F.
Relative Humidity = 100%
Rate of Elongation = 2 in./min.
Initial Length = 1.84 in.
Initial Diameter = 1.24 x 10^{-3} in.
Points Along Curve Calculated From Burte-Halsey Theory

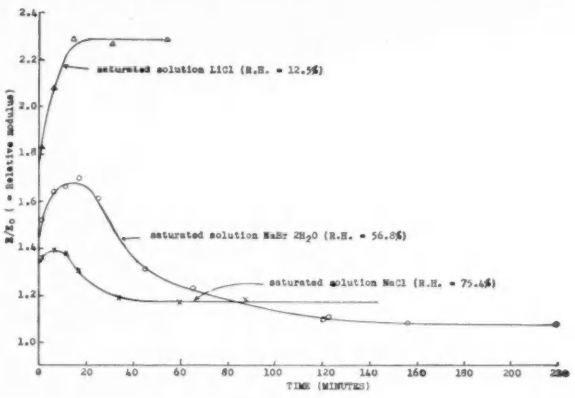

Fig. 5

Relative "Hooke's Law" Modulus vs. Time After Adding Salt Solutions to an Initially Wet Fiber

ery and appreciation of the Hookean modulus as a useful yarn and fiber parameter, via the circuitous route paved with dashpots, springs, energy barriers and other physical abstractions, will probably alone justify all of the past laborious experimental and theoretical studies of fiber mechanics.

Summary

To some who read this article, the title may seem misleading in that matters of objectives, organization, and assignment are discussed as well as actual research findings. In the broader sense, however, research includes all these considerations. In particular, I have emphasized the practical textile basis underlying our fundamental research assignments, since it should be of interest to the A.A.T.C.C., an organization which has done such excellent applied research throughout its history. Finally, I have presented some hitherto unpublished research findings which appear to possess both scientific interest and eventual practical value.

There is nothing holy about research, fundamental or applied; it is simply another profession which appeals to many hard-working and fairly intelligent people first, because it is fun and second, because it has a habit of yielding benefits to mankind. The prime requisite of any successful research program is an able, well-trained research scientist. Next in importance is his assignment to a reasonably well-defined problem which will generate his enthusiastic attack. Lastly, he should be provided with some laboratory facilities, technical assistance and perhaps some "direction"—as little of the latter as can be managed. Application of these simple principles and acknowledgment of the necessity for continuity in research has led to amazing advances in many industries. There is no reason whatever to answer that the textile industry cannot likewise profit from research if it "follows suit".

In conclusion, I wish to acknowledge the contributions of the various Institute and Foundation staff members and Research Fellows which form the basis of this article, as well as the help of our librarian and others who made possible its preparation under unusually hectic conditions.

TABLE VIII

YARNS (results of 100 tests)	*AGED YARN (987 Grex)*	*UNAGED YARN (998 Grex)*
†*Breaking stress (megagrams/cm²)	0.746 ± 0.10	0.618 ± 0.11
†*Modulus (megagrams/cm²)	20.6 ± 2.1	12.8 ± 2.0
*Breaking extension (%)	7.70 ± 2.32	6.70 ± 2.03
FIBERS (results of 25 tests)	***FROM AGED YARN***	***FROM UNAGED YARN***
Breaking stress (megagrams/cm²)	0.94 ± 0.38	1.12 ± 0.41
Modulus (megagrams/cm²)	27.1 ± 7.8	26.0 ± 7.7
Breaking extension (%)	11.9 ±11.1	12.8 ± 9.9

* statistically significant differences.
† calculated on linear weight basis assuming density = 1.32.

NOTE: Caution should be used in comparing absolute values of corresponding fiber and yarn properties although linear rate of extension (1.2 inches/inches length/minute) was the same in all cases.

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ANNUAL BUSINESS MEETING*

October 13, 1949

THE meeting convened at five o'clock, Henry F. Herrmann, President of the Association, presiding.

President Herrmann: Gentlemen, the annual meeting is about to commence. If I may have your attention for about five minutes we will comply with what the bylaws prescribe as an annual fixture.

The first thing I want to do is to extend an invitation to any member present or available on the premises to ask any questions concerning the operation of the Association which he may have. The purpose of this forum is to accord anyone who so desires an opportunity to inquire about our affairs.

For the record, I would like to briefly review some of our finances. Our general membership income is a matter of $41,346.50. Our sustaining membership contributes $597.50, and our corporate members, $44,410, a total of $86,354.

We have other income approximating $25,000, yielding a total of $111,452.26.

Out of this we have had disbursements for research of $36,738.21. Other disbursements in connection with the general operation of the Association, including the subscriptions to the *Dyestuff Reporter*, the *Year Book*, the maintenance of the office of the Secretary, etc., of approximately $50,000. The total expenditures are $86,671.06. The excess of income over expenses is $24,781.20.

We have adequate coverage at the present time in banks and in security investments. With a margin of less than $25,000, and with an increasing program for research and for expenditures in connection with publications such as the monographs as well as the *Colour Index* which is going to run into a very sizeable sum, we have to be extremely careful in the management of our funds. Obviously, we need additional income through personal memberships as well as corporation memberships.

As I mentioned before, the outlay for research in the last twelve months covered by our fiscal year amounts to $36,738. Our budget for the next twelve-month period is very close to $50,000, so immediately we have $14,000 additional funds to secure. We have obtained from corporate members $44,410. We obviously must strive for a larger income—if it can be fifty or sixty thousand dollars, it would be none too much.

People have said this is a bad year for the soliciting of corporate support. I completely and utterly disagree with that premise. I was told that every year in which we have had drives in behalf of corporate support. Most notably, last year we were told that 1948 would be a bad year, and there were people who were supposed to go out and solicit funds who said it would be better for us not to go out because we would do more harm than good. Well, they certainly passed up a banner year for our work.

As for 1949, dismissing for the time being pessimism, we have a combination of two circumstances which are working for us. No. 1, business is not so bad as it has been painted. No. 2, there is an increasing awareness on the part of industry that new things must be done in order to face new competition. It is the everlasting hope of this Association that it has the capacity to produce new things, new ideas, and new vehicles for increasing the profitability of textiles in so far as this phase of the business concerns us, and that is on quality standards pertaining to color, finish and dimension.

I consider the recent growth of our Association as an indication that its work is receiving widespread recognition. Our personal membership approximates 6,000 and our corporate membership is nearing the 350 mark. Along with the Western New England Section and the Hudson-Mohawk Section was added a Pacific Coast Section which is now being divided into a Northwest Pacific Coast and a Southwest Pacific Coast Section. It is interesting to note the calibre of the men who are responsible for the organization of these new Sections. They represent the mill management and the technical personnel with an avowed desire to keep abreast of late developments in the textile industry through a participation in A.A.T.C.C. activities. The men whose work has taken them far away from the customary textile centers feel very keenly their separation from the sources of knowledge on which we all rely to remain up-to-date in this ever-changing business.

A number of interesting things have transpired since our last annual meeting in Augusta. We have established a Student Award, an annual award to the member of the graduating class of certain selected schools who has done the best work in the field of textile chemistry during his college career.

Obviously, the purpose of that is not merely to reward the student but to at once bring him within the aura of our influence. We have published Monograph No. 1 on "New Analytical Methods for Textile Chemists." It is to be followed by No. 2 which is in the process of being written and which I earnestly believe will represent a contribution to the industry second to none.

I have said, and I would like to repeat what I sincerely believe, that this monograph on modern methods of vat dyeing is a book that no one else could write except through the cooperative effort of members of this Association. Not a word of it is being copied from elsewhere. No professional writer would have access to the knowledge of the fundamentals of the art and science of the application of vats that we attempt to portray in this volume. It will be 1949 in spirit, 1949 in experience, 1949 in development, mechanical, physical and chemical.

In the course of the year we were shocked by the death of Dr. Louis A. Olney, and of course our records show suitable tributes and a resolution bestowing on him the title of Founder. The impact on us of the loss of Dr. Olney, both personal and from an Association standpoint, was severe. However, Dr. Olney, having withdrawn more and more from active direction of our affairs, and having been replaced by other men,

* Held during Atlantic City Convention, October 13, 1949.

his passing found us not completely unprepared. We are getting along and I hope will continue to get along; the work shall not lag because of his loss.

In fact, I might go so far as to say that our entire Association is gearing itself through organization and the distribution of responsibilities so that much as we value the individual, the loss of an individual cannot deter us from our course.

During the year we have participated in two outside events. Of themselves they are not too important, but in so far as they demonstrate what we are trying to do—that is, to get out of our shells and be not the A.A.T.C.C. as it was for about twenty-five years—but to mingle more and more in the affairs of the industry at large, I do believe that they mark a stepping-stone in our history. I refer to our participation in the Textile Wet Processing Exposition, held in New York this last June, at which time we had an A.A.T.C.C. Research exhibit which was attended and visited by many hundreds of people who are not members of our Association but who are directly interested in the affairs of this industry with which we identify ourselves.

Attendance at the exposition was by invitation only, and the invitations were issued only to the direct representatives of concerns who deal in the commodities and are concerned with the processes which are our agenda.

Then we participated in a symposium of an educational nature, sponsored by the N.R.D.G.A., to try to teach the selling personnel of the retail trade something about the techniques involved in the manufacture and grading and in the durability of materials which have been dyed, printed and finished.

In the course of the year and quite recently, the Alfred P. Howes Memorial Endowment was set up, consisting of an annual prize of two hundred dollars for the best paper presented before a local section and published in the *Proceedings*. Obviously, the purpose of this is not merely to reward somebody, but to act as a stimulus for more and better technical papers.

Then we have had and continue to have under consideration, a number of very important amendments to our constitution. I wish to review them briefly so that for the record you will know in what terms we are thinking. The first is an amendment to the constitution with respect to the method of amending our constitution, which at the present time is considered to be very slow and cumbersome. The second concerns itself with the establishment of a new office, namely, that of President-elect. A President-elect shall be elected in the usual manner and will be in office for two years prior to his election to the office of the presidency. Then there is under consideration the establishment of four Regional Vice-Presidents, representing Northern New England, the Middle Atlantic States, the South and West, running all the way from our Mid-West Section to the Pacific.

One of these Vice Presidents is to be elected by each of the individual regions. In other words, Vice Presidents will not be elected by the national body, but one coming from each of the regions will be elected by that region. In due time, one of these Vice-Presidents, if available and considered suitable, is to be selected for the position of President-elect. Then after two years, if the Association still feels so disposed, he would be the natural and logical candidate for the office of President.

The new Revised *Colour Index* is occupying very much time and a lot of effort. We have had very important meetings recently. Having consulted legal advice we now feel that we are in a position to begin to draft the contract whereby the A.A.T.C.C. will enter into a partnership agreement with the Society of Dyers and Colourists for the making and the publishing of this new *Colour Index*. It is going to be a tremendous undertaking, and it may well become the biggest enterprise in which our Association has participated.

For the benefit of those who were a bit late and to close my remarks in general, I again wish to state that our Association concerns itself primarily with the problems which emanate from the dyeing, printing, finishing, and in general, the wet processing of textiles. We are of that group, either as mill operators or as suppliers or as scientific men in various laboratories affiliated with that work.

We should have the pride of feeling that because we are constituted that way, we comprise the brains of this important industry, and what we cannot accomplish separately as individuals we can do collectively, and both the strength and the future of our Association lie in these endeavors.

My last word (because it is that, with the exception of a few remarks I may make at the dinners) is a "thank-you" to the Association for three ripe and, shall I say, very full years. It has been a pleasure to serve you. I hope that in the edifice which it represents, a few stones may be allocated to me with my initials somewhere as having contributed something of value.

Gentlemen, the meeting has been and remains open for any questions you may have to ask. I have here the copy of our annual audit by Price, Waterhouse which contains all the figures with respect to our finances. They are available for your inspection. I have here also a Minute Book comprising the work of the Council for the past year. That I will leave here for the inspection of anyone who is interested. I myself shall be pleased to remain for any personal questions.

Unless I hear anything from the floor to the contrary, the meeting is adjourned.

. . . The meeting adjourned at five-ten o'clock. . . .

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South Central Meeting

THE first 1950 meeting of the South Central Section of the A.A.T.C.C. will be held February 18th, at the Hotel Patten, Chattanooga, Tennessee.

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Report of Utica Technical Institute Student Chapter

ON November 16, 1949, the Utica Technical Institute Student Chapter held its regular meeting by attending a lecture and demonstration in the Utica branch of the American Woolen Mill dyeing and finishing departments.

The speakers were Charles Cockroft, overseer of the dyeing and finishing department, and Charles Young, boss dyer. Mr. Cockroft spoke on the importance of good finishing and demonstrated along with his lecture showing how some of the techniques are performed. Mr. Young spoke on the dyeing process as employed by the mill.

The next meeting is scheduled for this month with the chapter preparing a program to welcome all new members.

Respectfully submitted,

ARMAND DI MEO,

Secretary.

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Report of Clemson Student Chapter

THE Clemson College Student Chapter enjoyed a banquet November 29, 1949, at Anderson, S. C. Professor Joseph Lindsay Jr. introduced the guest speaker, Mohammed Islam from Pakistan, India, who is a student in Textile Engineering at Clemson. Mr. Islam spoke on "The Cultural and Educational Systems of India".

A brief business meeting was held afterwards with Roy H. Boggs, chairman, presiding.

Respectfully submitted,

H. M. REYNOLDS,

Secretary.

Thursday Evening Session—

REPORTS TO CORPORATE MEMBERS*

By LEONARD S. LITTLE

Chairman, Corporate Membership Committee

MR. Toastmaster, Ladies and Gentlemen, and all Members of the A.A.T.C.C.: I will enter into the spirit of this occasion and skip the first page and a half of this talk. (Laughter and applause). I could reminisce about all the happy times I have had in a number of your Sections but I guess you can do without that.

Getting into the meat of the program, growth of corporate membership, we now have over three hundred members in this classification; in 1941, we had thirty-three. Contributions from corporate and sustaining memberships have shown steady and consistent growth amounting to $45,000 in 1949. Corporate contributions have been raised from a low of $25 to top contributions of $1,500. We have five suggested classifications for dues in brackets of $1500, $750, $400, $200 and $100, respectively.

The funds received from corporate members' dues are set aside exclusively to support our research. The research program under the direction of the Executive Committee on Research will be covered in a short, to-the-point presentation by its able chairman, Bob Bonnar. It was my privilege to assist in the organization and direction of the committee during the first four years of its endeavors as chairman. I wish to emphasize to the members, especially our corporate members, that you have little idea of the hours of sacrifice and hard work every member of the Executive Committee on Research has contributed to its success. Of no one is this true to a greater extent than of Bob Bonnar himself.

Dr. Harold W. Stiegler, Director of Research, and his group at Lowell, are functioning with definite and marked increase in effectiveness each year. Textile research, generally speaking, is a slow, time-consuming job. Rarely do we secure outstanding revolutionary accomplishments in the first few years of endeavor. The work of the research group is beginning to jell. Some of the new developments are on display in the Exhibit Hall. They give real cause for encouragement and promise of even better things to come.

The value of A.A.T.C.C. research to our corporate members: the development of many new textile fibers and the transformation of those fibers into new and untried fabrics by the textile technologist, has placed a tremendous problem in the laps of the textile chemists and the finishing plant personnel. The radically new and in many cases downright baffling properties of these new fibers are in a very short space of time not only changing our ideas of processing procedure and finishing and dyeing equipment, but even requiring specialized methods and equipment in garment manufacture. The confusion—and it is an increasingly growing factor in the minds of the ultimate consumer—requires more clearly defined methods of evaluation.

The Executive Committee on Research was organized in 1943, with its prime object the revision of old test methods and the development of new ones to determine end-values of textiles. How greatly this was needed, and how much more needed it is today, is an accepted fact. The confusion in the mind of the ultimate consumer is reflected in greatly increased interest on the part of the Federal Trade Commission to speed up and broaden the enforcement of definite and informative labeling backed by practical end-use test methods.

This latter job is one that no chemical or textile organization could afford to tackle single-handed. It has to be, by its very nature, an institutional job. To this vital need the work of the A.A.T.C.C. Research Program is largely dedicated. Real and definite progress is being made. This is the proper approach to the solution to the problem. Top men from industry working with top scientists from our educational and government institutions, present a roster where all points of interest are fully represented.

The value in dollars of the time and material spent by the various research committees each year would amount to several hundreds of thousands of dollars if it had to be paid out of the Association treasury.

It is not claimed that research work replaces that done by the chemical and textile manufacturers, finishers, converters or retailers. Its purpose is not to make new chemicals, new fibers, new fabrics or new garments; its purpose is to develop practical and sound methods of evaluation for the products of our industry. It gives to industry a measuring stick to guide the course of future research.

The value of technical knowledge gained by the personnel of our corporate members cannot be estimated. I told in my paper about the many periodicals we publish, etc., but I can safely skip over that section also. There is another more intangible value to our corporate members from the A.A.T.C.C. which I think may be the greatest value of all—the opportunity for the men and women in their organizations to get together with the personnel of other organizations with similar and divergent interests in this marvelous industry of ours. How *much* greater benefits all corporate members can get by encouraging their personnel to attend all possible sectional meetings and conventions, to endeavor to glean new ideas and new knowledge. New technical knowledge and experience is the backbone of America's industrial progress.

Especially do I plead for the encouragement of the younger men in the organizations of our corporate members to mingle with men of more varied and greater experience. It has been my privilege to be associated with a great number of the younger men in the industry. This association and friendship has been the greatest pleasure of my career.

Encourage your people to study and to get on A.A.T.C.C. research committees. It will pay you and them big dividends.

I must close. We welcome all constructive suggestions and criticisms we can get. We believe in our research program. We know that progress is being made. We know the vital and urgent need for

* Presented at Thursday Evening Session, Atlantic City Convention, October 13, 1949.

new and improved methods. We thank you one and all for the splendid support you have given in the past. We promise you we will justify your continued and increasing support in enabling the A.A.T.C.C. to do its part in building a bigger and better textile industry through research.

By J. ROBERT BONNAR

Chairman, General Research Committee
Chairman, Executive Committee on Research

MR. Chairman, Mr. Seibert, Honored Guests, Officers, Members and Friends: I am now somewhat in a quandary because I have heard so much about streamlining this program that I decided merely to get up and say "Nuts!" and sit down. But George Schuler rather stopped me on that when he said this was the serious part of the program, so I changed signals.

Then a few moments ago I decided to get up and simply say that I agree with everything that has been said, but when speaker Little spoke of what a good job the E.C.R. had done I saw I couldn't just agree as it would toot the horn for the E.C.R. by its chairman.

I am not going to talk too long though, because this suit is too small and I want to get it off in a hurry. (Laughter). And in the second place, the ever-conscientious Bill Cady has called a meeting to convene after this meeting in order to decide *Colour Index* matters, and that's the truth.

In the third place, in spite of what has been said to the contrary, the letter asking me to speak contained a little note as to how long I should talk, so I cannot go into detail on the work that has been done; it would be repetitious anyway to speak on why we need standards. We know very well that that is a serious proposition.

It isn't like the little lad in school. When the teacher said, "What's the difference between 72 and 100?", my son—I mean this lad—said "that's what I say—"what's the difference?" (Laughter).

We do not take that attitude. We know what we want, where we are headed, and are trying to do a good job.

Two years ago in Chicago I spoke of the fact that we had too many old wheelhorses doing the job, going on new committees and undertaking new projects, and that we were out for new blood. I am glad to say that after a period of two years we have more than doubled the number of people working on committees. As of this moment there are three hundred and twenty-eight individual members of this Association working on active committees which we have. That is pretty representative, but we have not stopped there. We are still after new blood.

We have formed the Section Advisory Research Committees to help the General Research Committee, and they are doing excellent work. They do not know it, but they have another job in front of them, with fourteen new committees to be formed as soon as we can get to it. They are going to be asked to suggest names of people familiar with the subjects in question so that we can form committees for that kind of thing.

We have decided there are too many standard pieces of equipment, standard fabrics, standard methods, etc., for everyone to be familiar with them. We are going to issue a bulletin or brochure which will have that information and data in it, together with prices, so you will be able to get anything the A.A.T.C.C. puts out. There is also the suggestion that you write to us if there is something you think we ought to do.

In closing, I want to say that I am very pleased to be here tonight to help honor the Medalist. I have known over a period of years the hard work he has done on behalf of the General Research Committee. They appreciate the work. The committee could not have done many things if it had not been for him.

Changes in Research Committee Personnel

CHARLES DORN of J. C. Penney Company, Inc., has been appointed Chairman of the Research Sub-Committee on Fastness to Washing.

Charles A. Seibert has been appointed Chairman of the Research Sub-Committee on Light Fastness. William A. Holst, Jr., who has been Chairman for three years must, according to our constitution, retire as Chairman. He will continue as a member of the Committee.

H. G. Scull of A. M. Tenney Associates has been appointed Chairman of an active research sub-committee on Atmospheric Fading of Dyed Acetate Rayon. Mr. Scull has been Chairman of a reference committee which is now being activated. Reflecting its change in status a new committee will be formed in order to study actively problems on atmospheric fading.

Frederick T. Simon of Peerless Woolen Mills will be the new Chairman of the Sub-Committee on Color succeeding Dr. E. I. Stearns of the Calco Chemical Division of the American Cyanamid Company.

The Executive Committee on Research is contemplating the appointment of a separate sub-committee on detergency of grease wool and carpet wools to undertake the work of setting up standard test methods for these fibers.

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News Items From the Research Committee

Gifts from the National Retail Dry Goods Association and the Cotton Textile Institute added to a previously announced gift assure funds covering flammability research at Lowell for the Flammability Sub-Committee.

A recent visitor to our A.A.T.C.C. Laboratories at Lowell was Hans G. Lind, Head of the Testing nad Laboratory Department, Nyborg's, Sweden. He was here to study new developments as regards dyeing and finishing, as well as test methods for textiles and auxiliaries, and also research in connection with worsted and woolen manufacturing processes.

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Correction

A. R. Thompson calls our attention to an error which appears in the story on "Harold Mason Chase, 1948 Olney Medalist" as published in the October 18, 1948 issue. The last word in the second paragraph under the heading "Returns to Textile Industry" on page P685 should be *dehydrothiotoluidine* instead of *dehydrorthotoluidine.*

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Dr. Ravich to Speak at New York Section Meeting on January 13th

DR. LEONARD E. RAVICH, Vice-President in Charge of Research, Vat-Craft Corp., New York, will speak on "Photochemical Dyeing" at the January 13th meeting of the New York Section. This paper will discuss the use of optical and radioactive source material sensitizers in the photochemical development of dyestuffs.

The meeting will be held at the Hotel New Yorker, New York City, and will be preceded by a dinner. Dinner reservations may be made with the Section Treasurer, John H. Hennessey, General Dyestuff Corporation, 435 Hudson Street, New York 14, N. Y.

EVALUATION OF DISPERSING AGENTS

To Aid in Dyeing Cellulose Acetate Specifically and New Fibers in General

As a result of the answers to the questionnaire sent out by the A.A.T.C.C. in 1947-1948, the New York Sectional Advisory Research Committee formed the following committee to work on this subject:

Dr. E. I. Valko, *Chairman*
George F. Converse
Russell J. DeWitt
Joseph W. Farquhar
Dr. William H. Gardner
Herman Hutten
Max Licht
Henry Millson
Dr. A. Roy Pizzarello
Daniel Sassi
George Schuler
Herbert G. Scull
Arnold Silver
Arthur Wachter
George Ward
Dr. Paul Wengraf
George Wernz
Max W. Winkler
John Zelek

A series of meetings were held. In order to evaluate the effect of dispersing agents on the dispersibility of the dyes, the Committee considered its first task to be to develop a method to determine the dispersibility of the various commercially available acetate dyes. It was recognized that the procedure should be easily applicable in the laboratories of the textile mills as well as in those of the dye manufacturers. The committee surveyed the methods available, reviewed the results of many laboratory experiments and agreed upon the following tentative test method, which is expected to give reasonably reproducible results.

SCOPE.—This method of test measures the dispersibility of commercial acetate dyestuffs. By application of the test, the effect of additions such as soap or detergents on dispersibility can also be measured qualitatively.

APPARATUS.—

Buechner funnel, with inside plate diameter of 9 cm.
500 ml. Suction Flask
Suction apparatus, arranged to give a vacuum of 150 mm. of mercury.
250 ml. beaker.
100 ml. graduate
2 ml. pipette

MATERIALS.—Desized and bleached 80 x 80 cotton print cloth, cut into filter circles with a diameter of 9 cm.

TEST PRODUCT.—Acetate dyestuff of normal commercial concentration. Where an experimental product differs from the expected commercial concentration, the amount of the sample taken for the test should be adjusted.

PROCEDURE.—1.00 gram of commercial acetate dyestuff, or its equivalent, is thoroughly pasted with 2 ml. of water.

A circle of filter cloth is placed on the Buechner funnel, the vacuum is turned on and 150 ml. of water at 170°F. is poured through the funnel so as to warm the funnel and to seat the cloth filter circle. 100 ml. of water at 160°F. is poured into the paste and the mixture is stirred steadily with a glass rod for 30 seconds. The dispersion is immediately poured through the filter cloth with the suction turned on. The cloth is removed and air-dried.

The determination can be repeated at other temperatures to study the effect of temperature on dispersibility.

For determining stability of dispersion, the dispersed dyestuff, after being stirred for 30 seconds, is allowed to stand for the required time at a specified temperature before filtration.

EVALUATION.—The amount of residue to the filter cloth is observed visually. If the amount is slight, covering only the holes of the funnel, the dispersibility is called "excellent"; if the cloth is lightly covered, the dispersibility is called "good"; and if the cloth is heavily covered, the dispersibility is judged "poor."

Attempts have been made to correlate the dispersibility, as defined by the above method, with speckiness in dyeing and padding. These attempts proved to be unsuccessful since dye samples judged to have poor dispersibility frequently dyed satisfactorily, especially when fully developed.

Most of the experimental work leading to the above method has been carried out by G. W. Wernz. Mr. Wernz is planning to publish, in the near future, a paper in the *American Dyestuff Reporter* which will contain the experimental data leading to this tentative method and which will demonstrate the application of the method to the diverse aspects of the problem of dispersibility.

Stainless Steel Equipment Corrosion Survey

THIS report represents an interesting example of the constructive contribution which can be made to industry by the A.A.T.C.C. through its Sectional Advisory Research Committee. These committees are relatively new units in the country-wide activities of the Association which make possible either specialized emphasis on technical problems in individual areas where there is a heavy concentration of specialists in a particular field or collectively provide a mechanism for industry-wide surveys.

A few years ago, when it appeared that corrosion of stainless steel equipment might be a serious general problem in the dyeing industry, a survey was conducted by the chairmen of the Sectional Advisory Research Committees. Based on the returns from all sections, the Research Staff at Lowell drew up the following report which indicates that no general problem exists.

Because of occasional corrosion difficulties in the past with stainless steel equipment in the textile wet processing industry, several members of the American Association of Textile Chemists and Colorists felt that it would be advisable to set up a committee to study the matter thoroughly.

J. Robert Bonnar, Chairman of the General Research Committee, instituted a primary survey by contacting various qualified individuals in the wet processing field to determine the nature and the extent of corrosion troubles. Replies to this survey are now all in and it is evident that further investigation by a committee will not be necessary at this time because corrosion difficulties and complaints are not widespread or serious.

It is believed that conditions which brought about breakdown may have been caused by substitution of different alloys during war time shortages or by wet processors failing to give the manufacturers sufficient information to enable them to recommend the correct alloy.

Electrolytic action can cause at least as much trouble as chemical action. Chemical operations which produce the greatest damage are those involving strong oxidizing or reducing agents. Chemicals which set up secondary reactions, such as zinc sulfoxylate formaldehyde, hydrogen chloride, hypochlorites and sulfides, are particularly bad. Certain percentages of sulfuric acid in water at high temperatures have also been known to cause trouble. There have been some complaints that when metalized colors were

used in stainless steel kettles, pitting and corrosion occur. It is quite possible that it is the dilute (.5%) sulfuric acid present in the dyebath which is causing the trouble.

Close cooperation between supplier and user is absolutely essential if the wet processor is to have a minimum of trouble. It is generally agreed that if stainless steel equipment is properly engineered and the proper type selected for the intended use, its life should be anywhere from 20 to 25 years.

Molybdenum-containing steels have somewhat better resistance to deterioration than the regular stainless steel alloys, but the degree of superiority may not be sufficient to justify the increase in price. Alloys with at least 28% combined nickel and chromium, not more than .12 carbon and finished with a No. 4 polish, have proved very satisfactory for most uses.

Seams, joints and bearing plates are the spots where troubles are most likely to occur. Consequently, extreme care must be given to the making of such connections. Pitting, erosion, corrosion and seam breakage are the principal types of breakdown. These troubles should be guarded against by immunizing (a phosphoric acid, bichromate treatment), normalizing and butt welding.

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

49-28

Education: Textile School graduate.

Experience: Laboratory technician and color chemist.

Age 32; married; references; position as asst. dyer desired.

11-28, 12-12, 12-26, 1-9

49-29

Education: Graduate, tech. inst., chem. engr.; with graduate courses.

Experience: textile research chemist, technical sales.

Age 35; single; position as salesman of dyestuffs and textile chemicals in vicinity of New York preferred, but will go elsewhere.

11-28, 12-12, 12-26, 1-9

49-30

Education: High school with college extension courses in chemistry.

Experience: dyeing and finishing of synthetic fiber fabrics, including testing and development.

Age 28; married; references; eastern U. S. preferred.

11-28, 12-12, 12-26, 1-9

49-31

Education: graduate, technical institute.

Experience: laboratory technician to head dyer, cotton and synthetics.

Age 44; married; references; vicinity of New York, or eastern states preferred.

11-28, 12-12, 12-26, 1-9

49-32

Education: textile institute graduate.

Experience: chemist and dyer, including supervision.

Age 31; married; references; will go anywhere.

11-28, 12-12, 12-26, 1-9

49-33

Education: B.S. from textile institute with honors, 1949.

Experience: chemist and salesman for industrial detergents.

Age 33; married, references; located in New England, but will go elsewhere.

12-12, 12-26, 1-9, 1-23

49-35

Education: B.S. in Textile Chemistry expected from Clemson College, Jan., 1950.

Experience: 1 summer in cotton mill; U. S. Navy; sales clerk.

Age 23; single; references; sales, or dyeing and finishing, in South preferred.

12-12, 12-26, 1-9, 1-23

49-36

Education: B.S. in Chemistry & Dyeing expected from Philadelphia Textile Institute, Feb., 1950.

Experience: 3 summers as laboratory asst., machine hand and chemist.

Age 32; married; references; will go anywhere.

12-12, 12-26, 1-9, 1-23

49-37

Education: University B.S., with subsequent courses in chemistry, sales & textiles.

Experience: Bleachery superintendent; sales manager; commanding officer, U. S. N.

Age 39; married; references; location not restricted.

12-26, 1-9, 1-23, 2-6

49-38

Education: B.S., Lowell Textile Institute; expecting M.S. from University of N. H. in January, organic chemistry.

Experience: Five summers, dyeing, bleaching, resin finishing.

Age 25; single, references; position in a finishing dept., northeast U. S., preferred.

12-26, 1-9, 1-23, 2-6

49-39

Education: graduating from Philadelphia Textile Institute in February.

Experience: four summers as plant apprentice and laboratory asst., bleachery and dye works.

Age 21; single; references.

12-26, 1-9, 1-23, 2-6

49-40

Education: A.B., chemistry, Cornell; finishing course at Philadelphia Textile Institute.

Experience: two summers, asst. in dyehouse and laboratory.

Age 25; married; references, South preferred.

12-26, 1-9, 1-23, 2-6

49-41

Education: Expect graduation from Philadelphia Textile School, chemistry & dyeing, 1950; evening school diploma in accounting.

Experience: two years accountant and laboratory ass't; three summers laboratory ass't. and dyehouse apprentice.

Age 31; single; references.

12-26, 1-9, 1-23, 2-6

49-42

Education: Expect B.S. from Philadelphia Textile Institute, 1950.

Experience: two summers, kettle hand and laboratory ass't.

Age 23; single; references; tech. sales, east coast, preferred.

12-26, 1-9, 1-23, 2-6

49-43

Education: Expect B.S. from Philadelphia Textile Institute, 1950.

Experience: four years chemistry and dyeing; two summers in dye laboratory.

Age 36; married; references; no restriction on location.

12-26, 1-9, 1-23, 2-6

49-44

Education: expect B.S. from Philadelphia Textile Institute, 1950.

Experience: 1½ years in various parts of woolen and worsted mills, including dyeing and finishing.

Age 25; single; references; location not restricted.

12-26, 1-9, 1-23, 2-6

49-45

Education: B.S. in textile chemistry and dyeing from textile institute, 1949, with year of university training in engineering during war.

Experience: five months in dyestuff application laboratory.

Age 24; single; references; dyehouse or mill laboratory in New England preferred.

12-26, 1-9, 1-23, 2-6

General Technical Section—

TEXTILE EDUCATION AND RESEARCH*

BERTRAND W. HAYWARD
Director, Philadelphia Textile Institute

EVERYONE knows as Portia did, that "If to do were as easy as to know what were good to do, chapels had been churches and poor men's cottages princes' palaces". If we now did as well in production or education as we know how to do, if the findings of research were converted more readily into application, our commercial and social progress would be much greater than it is.

From a literary statement of chiefly moral applications, and a generalization about the lag in application of fundamental discoveries in day to day practice, let us speak somewhat more specifically about the textile industry. In the *Wool Science Review* for February 1949 there is an article about the Textile Department at Leeds University. At Leeds, research of a somewhat fundamental nature has been carried on for about twenty years. They are not convinced of the impact of this research upon industry. Their chief concern seems to be that there should be more research workers in industry capable of converting fundamental research into application.

A recent visitor at our school, D. Kemp Colledge, Chairman of Governors of the Scottish Woollen Technical College. expressed the same concern to me over the lack of impact of research on production. He pointed out that much of the great work of such men as Speakman still awaits application.

It is perhaps no less difficult to control power than it is to unleash it, no less difficult to select and revise creativity than to be the original expressor. Practically all great artists and research scientists are indebted to previous workers for the leads to their discoveries, and in a way are adaptors and editors, always with the addition of their own insight and correlating abilities. Involved deeply in highly specialized procedures they have neither time, nor perhaps interest, to explain for lesser minds what has become for the research worker, through his own efforts, perfectly obvious. If communication of the possibilities of practical application is incomplete, that is for the concern of someone else. Shakespeare was too busy creating new plays to be concerned with the critiques and expositions that scholars have been writing ever since. Only recently, in the obfuscations of modern art and modern literature, has it become necessary for cliques to expound at length upon their own importance, and boast that the lack of communication between their minds as expressed in their works, and of the readers' or viewers' minds seeking to comprehend, is solely because of the stupidity of the general public and the amazing brilliance of the creators. Fortunately the artists of science do not generally hold this contemptuous attitude. Research workers are concerned that their findings have impact upon manufacturing processes. They cannot be expected always to do this translation themselves, because further investigations await them. Hence the problem of science, industry and education is, as it ought to be with art and literature, how can the discoveries of the great pioneers on the frontiers of new knowledge be transmitted into improving life in the settlements, and how can people be brought to these frontiers of understanding for the general welfare?

In the textile industry, at least, there should be a ready answer. There are the excellent laboratories of private corporations. There are university laboratories. There is the Textile Research Institute and the Institute of Textile Technology. In addition there are associations such as the American Association of Textile Chemists and Colorists and many others. As a base to the pyramid, and as a perfect unit when used properly for the translation of fundamental research to applications in production, there are the textile institutes of the United States. Without ignoring Lowell, North Carolina, Georgia and the other schools for whom, and for whose administrators I have great respect, I should like to point out what the Philadelphia Textile Institute should mean as a prospective aid in the solution of this problem of translation. Evidence of the faith of the industry in its effectiveness as an aid to improvement of the industry can be seen in the nearly two million dollars spent for new buildings and a new site in historic Germantown. The industry believes in textile education to the extent that this money came exclusively from private sources. Our school is truly the only example of private enterprise devoted solely to textile education. Our graduates are now, and will continue increasingly to be, in positions of executive importance in all branches of the industry. Free from any political pressures our Board and our Faculty can direct themselves to the most important problems of all phases of the industry. No legislative exigencies can force our school to concentrate its energies on one or a few branches for political purposes. Because of its inherent qualities only a private institution, in any field, is likely to become national or international in scope. I believe, because of our nature, that the Philadelphia Textile Institute has certain inevitable advantages over state schools in accomplishing what I hope all textile institutes, with adequate assistance, may achieve, the development of executives and supervisory employees educated to close the gap between research and application.

Except in the case of a few exceptional individuals the textile institutes do not attempt to develop top flight research scientists. They do develop, or attempt to develop, men who are alert, who know present processes and the attempts being made to improve them. They know too, enough science to understand and apply whatever findings basic research uncovers which are immediately applicable. Textile school graduates are insurance that basic research will be applied in the improvement of manufacturing processes.

An educator deals with such variable substance, uses such inexact and fallible measuring instruments and so frequently has no opportunity ever to observe his product, that he may well be at a loss in a technical meeting of this nature where definite substance is carefully and accurately measured and where a long series of results is tabulated resulting in something definite, at least for a time. Since educators unavoidably deal with gene-

* Presented at General Technical Session, Atlantic City Convention, October 13, 1949.

ralizations it is not easy to become as specific as might seem desirable. Consequently, you must not expect me to compete in specificity with my learned colleagues on the platform.

Educationally we have been searching for a long time for an educational program which could retain the desirable qualities of appreciation for, and understanding of the past, and its confluence with the present and future, and add to it the technical attributes essential for earning a living. Thus liberal education presents a way to live if one had leisure, but fails to provide the tools to create that leisure. Professional schools may become so concerned with a trade or career that they fail to provide sufficient learning for worth while living beyond the bounds of the working tasks. A half the time in one school, half in the other, proposition serves only to make both more confusing. It is possible to integrate the more desirable goals of both in one individually controlled institution such as our school at Philadelphia. We have not done it; no one has, but the opportunity is ours.

No wonder, with our general educational structures, that there is lack of communication between upper and lower echelons in research, no wonder there is a culture lag, no wonder there is lack of understanding and even antagonism between management and labor. For the fact is clear that we have not decided what we want our schools and colleges to do. When our purposes were reasonably clear, that is, preparation for the priesthood or ministry, or as with English education the cultivation of a gentleman, preferably a gentleman for a fixed, closed caste society, the task was done rather well. The medieval seven liberal arts were so well organized, in fact, that despite superficial variations, and in spite of the advances in science and industry, they remain as the backbone of modern education. This is true even though, with universal education, our problem is obviously a totally different one.

The nature of educational development, the political pressures that inhibit public institutions, the tremendous changes in our ways of living brought about through science and industry, all have worked to widen the gap between research workers and supervisory employees, between knowing what to do and getting it done.

There are ways at hand to improve this situation. As indicated, the textile institutes offer excellent devices for closing these gaps, at least insofar as textile research and textile production is concerned. Naturally enough we need help. I have pointed out in articles and addresses elsewhere that, as is true with too many of our educational institutions, textile institutes lag behind industry because of the indifference of a certain few corporations, because of insufficient funds and too much out of date equipment. The promotion of textile education, not in any single institution, but on an all encompassing scale by such an organization as American Association of Textile Chemists and Colorists, by the Textile Research Institute and the Institute of Textile Technology, and by the corporations whose profits to any extent whatever are obtained from textiles, seems to me one of the surest ways to increase the impact of research upon manufacturing processes. With that would come, as a matter of course, great forward strides by our American textile industry.

To summarize: our problem is to do as well as we know how to do. This is a moral as well as a research problem. It is not due to the perversity of human nature, but to the lack of carefully planned educational programs designed to prepare people to work and live integratedly in the complex commercial and social world of today and tomorrow. Adequately supported with funds, equipment and information, the textile schools can serve the industry by educating students who, although few may become top flight scientists, will have the understanding of scientific principles and production methods enabling them to convert research discoveries to commercial practice. Educationally these remarkable institutions, and particularly the Philadelphia Textile Institute because it is private enterprise in textile education, have an opportunity to present a balanced program of science and mathematics, social and cultural studies, and their application in the textile industry, along with a specialized study of industrial methods which can prepare students to live and to make a living. This is the task we have set for ourselves at the Philadelphia Textile Institute. It is in this work that we invite the assistance of textile executives, of research scientists, of associations such as this great American Association of Textile Chemists and Colorists assembled here, of graduate institutions and of other educational institutions, that the impact of research may be felt more quickly, and that there may be a narrower gap between what we know and what we do. This we should do for the welfare of our own industry and our own nation, and for the maximum in our own individual development as workers and citizens.

As you see, I have not presented you with a completed experiment advancing human knowledge, nor even gathered for you data that would indicate a clear hypothesis, but I have tried to present a problem which is of concern to all of us, and indicated our need, as educators, for your assistance as scientists, that we may together as men collect our forces and abilities in a concerted effort to advance some tentative working solutions in our own area, the textile industry, to this complex and universal problem.

CALENDAR

COUNCIL

Meeting: January 13 (New Yorker, New York).

RESEARCH COMMITTEE

Meeting: January 13 (New Yorker, New York).

NATIONAL CONVENTIONS

1950: September 28 to 30, Portsmouth, N. H
1951: October 18 to 20, Statler, New York
1952: Boston.

NEW YORK SECTION

Meetings: Jan. 13 (Hotel New Yorker, New York), Mar. 3 (Hotel Statler, New York), April 14, May 5 (Kohler's Swiss Chalet, Rochelle Park, N. J.), June 16—Outing.

NORTHERN NEW ENGLAND SECTION

Meeting: Jan. 27, (Hotel Vendome, Boston).

PHILADELPHIA SECTION

Meetings: January 13, February 24, March 31, May 5 (Kugler's, Philadelphia), June 9 (Annual Outing), October 13, December 8, January 17, 1951.

PIEDMONT SECTION

Meetings: Jan. 21 (Poinsett Hotel, Greenville, S. C.), April 1 (Robert E. Lee Hotel, Winston-Salem, N. C.), June 30-July 1 (Ocean Forest Hotel, Myrtle Beach, S. C.).

SOUTH CENTRAL SECTION

Meeting: February 18, (Hotel Patten, Chattanooga, Tenn.)

WESTERN NEW ENGLAND SECTION

Meetings: January 27 (Rapp's Restaurant, Shelton, Conn.), March 10 (Waterbury, Conn.), April 14 (Rapp's Restaurant, Shelton, Conn.) May 26 (Waverly Inn, Cheshire, Conn.) June 23 (Outing at Wallingford, Conn. Country Club).

Annual Banquet Session—

THE PRESIDENT'S ADDRESS*

HENRY F. HERRMANN
President

MR. Toastmaster, Mr. Sayer, Fellow Officers, Fellow Members, Ladies and Gentlemen: There is one trouble, you know, with these expedited programs, the next speaker hasn't got a chance to compose himself. I usually come here with some ideas and then finally make up my speech while I am listening and waiting for my turn. This thing was too fast tonight, so I am glad I do have my notes. (Laughter).

This is my third and final address as President during an annual convention banquet. Obviously a tumult of thoughts crowds through my mind on this occasion—so much so that I find it difficult to choose a suitable beginning for my remarks. Perhaps by reading a number of open letters, the log jam of ideas will be broken and I can finish my talk along more orthodox lines.

* * * *

My first note is directed to our General Convention Chairman, Walter Fancourt, III.

Dear Walter:

On behalf of the Administration I take this opportunity of expressing our appreciation for the fine Annual Meeting you and your committees have arranged. When we last met in Atlantic City in 1944 the great war had been only partially won and great faith in ultimate victory over Japan wrestled with trepidation over the resources of a wily foe and worry for our kinsmen who were closing with them in mortal combat. There emerged a convention of the most earnest type in which the technical program outweighed all other considerations.

We had a wonderful time, but the keynote of the convention was "work." Years have rolled by and the cares, anxieties and special wartime responsibilities are well nigh forgotten.

However, the sober side of the annual meetings continues to remain their focal point, and I congratulate you on having achieved such a wonderful balance between work and play on this occasion.

As I said a year ago, however perfect the accommodations may be and fascinating the entertainment, the magnet which draws 1500 busy men from their shops and offices, with 300 visitors of the fair sex, to a common meeting place is the technical program superimposed on a background of other Association activities and the sense of solidarity in our participation in an event of considerable importance.

Walter, you have brought us to the Playground of the East—also one of its great Show Windows. We have enjoyed them both, but more than that we have strengthened the bonds that are welding a group of 6000 individuals into a dynamic force which will contribute in an ever-increasing measure to the welfare of our industry.

I take for granted that no one will misunderstand my remarks as implying any derogation of the pleasant and most beneficial contacts of a personal nature which these meetings afford. On the contrary, I believe that this phase of our annual meetings is extremely valuable insofar as it supplies a forum for the renewal of old friendships, the making of new ones and above all the informal exchanges of general technical experiences.

In closing, Walter, I repeat my thanks and submit those of the officers and Council for a job beautifully done, including our best exhibit to date. (Applause).

Sincerely yours,

* * * *

My next letter is addressed to C. Norris Rabold who has been serving as one of your Vice-Presidents, and as the only candidate for the Office of President is certain of being elected to that office.

Dear Norris:

I salute you as the incoming President of the A.A.T.C.C. With my congratulations goes a pledge of my unstinting cooperation in the administration of this office.

You are richly endowed with wisdom, tact and energy which this assignment requires. With the cooperation of your fellow officers, the Council and the Sections, a successful administration of your new office is assured.

I leave with you a message of faith—faith in what our Association stands for and faith that the more thoughtful segment of our membership is looking to you for leadership toward the achievement of our goals.

In the 27 years of our Association's life it has grown from an inconspicuous beginning of a few hundred members with little if any recognition on the part of older scientific societies and only the vaguest sort of operating agenda to an association of over 6000 members, including nearly 350 corporate members among whom are the most prominent names of the industry. They are imposing their trust in you.

Faith in yourself and in us will carry you over the road to success.

Your strongest assets are a conscientious Council and aggressive committees to pursue the Association's activities. I had this support and gladly admit that without it my best efforts would have been futile.

My best wishes to you, Norris, and to the Association an endorsement of its good fortune in obtaining you for the Presidency. (Applause).

Sincerely yours,

* * * *

My last letter is addressed to a young man who presents a light-hearted front, but cannot hide, from those who know him well, a deep interior fiber. He assumes lightly—so the outsider thinks—tasks which others shun because of the responsibility, work and time they entail. Never given to doubt, happy in his vision of what is right and democratic in his approach to committee work, he is one of your great assets. I refer to J. Robert Bonner, our Chairman of Research and the Chairman of the Executive Committee on Research.

Dear Bob:

It all seemed very casual when Dr. Olney appointed a committee some four years ago to study our research structure which in turn recommended the formation of a permanent Executive Committee on Research.

Ably headed by Leonard Little, this committee drafted a new research structure for our Association, and relieved Dr.

* Presented at Annual Banquet, Atlantic City Convention, October 15, 1949.

Olney of tasks which had become too much for him.

In turn you succeeded to the chairmanship of E.C.R. and the building process continued until last winter when we were shocked at the news of the untimely death of our beloved Founder.

One of the last remaining important chairmanships which Dr. Olney held was that of the General Research Committee. Obviously, this vital work had to continue since most of our Association's activity is directly concerned with research.

I take this opportunity of publicly thanking you for taking over our Founder's interrupted life's work and to acknowledge the importance to my administration of the settlement of this situation.

I continue to admire you for your capacity to conduct efficiently the obligations derived from these heavy responsibilities. It is hardly possible that any one who knows how much is expected of you envies you your voluntary accepted assignments.

Research constitutes the grass roots of our Association's activity and it must continue unabated. I recommend for you all the help and cooperation which can be found, but express as a parting commendation my confidence in the future of the research program you have so ably organized. (Applause).

Sincerely yours,

* * * *

My mail bag is very bulky insofar as it contains letters to the many associates who assisted me during the three years of my administration. Time does not permit even a glancing reference to them. All I ask is that all of you, officers, councillors and committeemen stand by your next president, C. Norris Rabold, and give him the support which I benefited from.

We have grown to formidable size. We have asked for and are receiving national as well as international recognition. Our publications have improved in quality and quantity. Our conventions have emerged from an atmosphere of reunions to very important, well-organized scientific and business meetings.

We are engaged in the task of bringing out a revised *Colour Index* in partnership with the British Society of Dyers and Colourists. The invitation from abroad to join in this costly and highly technical undertaking is strong evidence of the progress our Association has made.

Our intersectional contests have emerged from their humble experimental beginning to a recognized place in the industry's scientific orbit. These and many other activities assure us a promising future.

However, we must continue to grow in personal and corporate membership, to spread our base of scientific and financial resources. Our finances are solid, but our annual budgets keep growing with the increasaing demands on our facilities. The answer lies in your hands whether we continue to grow in stature and strength. We want more members from the application industries on our rolls and in our committees. We want more volunteer workers from scientific groups for scientific investigations, not that we hesitate to hire talent when needed and available, but because we are convinced that the toiler in research reaps as many fruits for himself as he can contribute to others—possibly more.

My last remark is a simple thank you for the privilege of serving you and thanks to my staff officers and others whom time does not permit me to mention by name.

This is not goodbye, but *Au Revoir.* (Applause).

OF INTEREST TO MEMBERS OF RESEARCH COMMITTEES

To Members of Research Committees of A.A.T.C.C.

The following message to Chairmen of Research Committees is also being forwarded to you herewith because it gives pertinent data which you, as a member of at least one committee, would be very interested in, we believe.

In addition to this, many of you who are now members of individual committees will in the future be chairmen of these committees and you should thus have the background of the system set up whereby Research A.A.T.C.C. can function in a smooth and consistent manner.

We would be pleased to have you abide by such requests as are in this message and also to receive from you any suggestions which you care to make from time to time concerning the activities of the Research Committee.

The tremendous undertaking of your association has for years been based on team-work, of which you are perhaps a small but very important part, and we desire to obtain your personal attitudes on what we are doing.

Very truly yours,
J. ROBERT BONNAR,
Chairman, General Research Committee
Chairman, Executive Committee on Research.

A Message to Chairmen of Research (Sub) Committees

As a Chairman of a Research (Sub) Committee of the A.A.T.C.C., you have assumed a place of honor, trust and responsibility. The A.A.T.C.C. in the past has grown in membership, accomplishment and prestige. Now you have an important assignment in continuing the promotion of an increase of knowledge of the application of dyes and chemicals in the textile field so that our prestige may further increase.

To assist and guide you in your stewardship of a Research (Sub) Committee, the Executive Committee of Research has prepared the attached "Rules of Conduct of Research (Sub) Committee". It is our hope that the archives of the Association will reflect the conscientiousness and assiduousness with which you acquit yourself of your responsibility by complete and adequate records of the activities of your Committee.

Rules for Conduct of Research (Sub) Committees

1. COMMITTEE MEMBERSHIP

(a) The Chairman of the (General) Research Committee, subject to the approval of the Executive Committee on Research, shall appoint (sub) committees as required from time to time to carry out specific research projects, such committees to be designated as "active" (sub) committees; also other (sub) committees on various subjects to which inquiries may be referred, such committees to be designated as "Reference" (Sub) Committees. Nonmembers of the Association on committees must be starred and will be noted in the official records as "cooper-

ating nonmembers". No member may be a member of more than three Active (Sub) Committees at one time.

(b) Each Active (Sub) Committee shall elect a Secretary and shall elect a Chairman, subject to the approval of the Executive Committee on Research. No member may be chairman of more than one Active (Sub) Committee at one time. No member may be Chairman of any Active (Sub) Committee more than three consecutive years, but an ex-chairman may become chairman again after a lapse of one year.

2. CHANGES IN MEMBERSHIP OF COMMITTEES

(a) Resignations from Active and Reference (Sub) Committees shall be reported at once to the Office of the Director of Research (for accurate central files) and this Office shall immediately notify the Chairman of the (General) Research Committee so that replacements can be appointed.

(b) A resigning Chairman or Secretary of a Research (Sub) Committee shall see that a successor is elected by the Committee and that the Director of Research is promptly notified so that the Executive Committee on Research can approve the new elections.

3. MEETINGS OF RESEARCH (SUB) COMMITTEES

(a) Meetings of an Active Research (Sub) Committee are called by the Chairman through the Secretary whenever necessary to conduct business. In general, it is customary to hold meetings on the day preceding a meeting of the (General) Research Committee in order that the latest action may be reported to the (General) Research Committee, which can then take official cognizance of the work of the Active (Sub) Committee.

(b) Notices of meetings of the (General) Research Committee are mailed to Chairmen of Active (Sub) Committees several weeks in advance so that Chairmen of Active (Sub) Committees may have sufficient time to designate on an enclosed return card whether or not a meeting of an Active (Sub) Committee will be held. Prompt return of these cards greatly facilitates preparation of schedules for meetings of Active (Sub) Committees and agenda for the (General) Research Meetings.

4. RECORDS OF (SUB) COMMITTEES

(a) The correspondence and files of Research (Sub) Committees shall be promptly turned over by resigning committee officers to their successors.

(b) Copies of important letters, reports, and research records shall be sent to the Office of the Director of Research as soon as they become available for inclusion in the Archives of the Association containing the permanent records of each Research (Sub) Committee. Each item shall be marked at the top for filing under the particular Research (Sub) Committee and under sub-topics for each committee, as for example:

Committee: Fastness to Washing
Subject: Launder-Ometer
Subheading: Jars

(c) When the files of Research (Sub) Committees become too voluminous, records that are no longer of immediate interest shall be culled out and sent to the Director of Research for inclusion in the Archives of the Association.

5. REPORTS

(a) When the Chairman of a Research (Sub) Committee has something to report, he shall prepare a report in writing covering the activities of his Committee since the last report and shall present it to the Chairman of the (General) Research Committee for the Archives. The report shall be marked at the top either "For Publication" or "Not for Publication". The Chairman of the Research (Sub) Committee or his deputy shall read and/or discuss the report at the Meeting of the (General) Research Committee.

(b) The Bylaws require that all Active (Sub) Committees shall report to the Research Committee at least once a year.

(c) When a Chairman of a Research (Sub) Committee has nothing to report, the fact shall be communicated to the Director of Research before the meeting of the (General) Research Committee so as to be so marked on the agenda for the meeting.

6. REPORTS FOR THE "TECHNICAL MANUAL AND YEARBOOK"

The Chairman of each Research (Sub) Committee shall prepare a report in triplicate for the *Technical Manual and Year Book* covering the activities of his Committee since the last *Year Book*. The manuscript for his report shall be submitted promptly after notice is received, generally shortly after January 1st. The report should state the problems studied by the Committee and succinctly relate the pertinent facts, experimental evidence and conclusions covering the activities of the Committee.

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• PATENT DIGEST •

PAUL WENGRAF

• Correction

The digest of U. S. Patent 2,480,755 which appeared on page 802 of the October 31, 1949 issue should be entitled "Dyeing Nylon *with* Insoluble Acetate Dyes, Mono—and Multifilaments Combined" rather than "Dyeing Nylon *and* . . . ".

Cellulose Solution—Alkali and Oxydizing Agents Used G, 2, 01

U. S. Pat. 2,482,042
(Montclair Research Corp., Van-Delden-Rust, Sept. 13, 1949)

Some patents, granted to Lilienfeld (see references below) disclosed that slightly degraded cellulose can be dissolved under certain conditions in alkalis without using any other dispersing agent. The present invention belonging to this group comprises a modification of these older methods with the object of producing cellulose which is readily alkali-soluble with refrigeration. The solutions obtained, according to the present patent, can be used for permanent finishes, sizes or the like. They are prepared by degrading cellulose in the presence of oxydizing agents under controlled conditions. The treating liquid may consist of any alkaline substance, inorganic or strong organic bases such as quaternary ammonium hydroxides, to which alkali resistant oxydizing agents (e.g.-sodium perborate, hydrogen peroxide, ammonium persulfate etc.) are added. A preferred oxydizing substance is ozone, which is soluble in alkaline solutions. Thus a mixture of cellulose and alkali may be treated with gaseous ozone at temperatures between the freezing and the boiling point of the mixture. Generally, the temperatures at which the degradations is effected are not critical. They are in the range of 25 to 100°C. Practically, cellulose is first mixed with excess alkali of about 20% and steeped therein. The alkali cellulose produced in this way has to be aged for some time after which the oxidizing agent is added and the mixture kept for some hours. This operation is followed by acidification, adjusting the pH to about 5. A product, which is precipitated, filtered, washed and dried consists of a white fibrous, alkali-soluble material. One of the examples gives a formula for preparing a finishing solution in which 8 p. of the product described above are dissolved in 80 p. soda lye 20%, 32 p. water and 80 p. of crushed ice. A cotton fabric is then immersed in this bath, squeezed, (to rid of excess) passed through 1.5% sulfuric acid, finally washed and dried. A finish fast to laundering is obtained. The specification gives a test for the optimal degradation point for the cellulose treated in this method: a 1% solution of the degraded cellulose in 8% sodium hydroxide should have a viscosity between 1.9 to 4 centipoises at 28.5°C.

References cited by the Patent Office, among others:

U. S. Pat. 1,036,281, 1912 (Lilienfeld): finishing cellulose fabrics by impregnating with viscose solutions in general and insolubilizing by known means such as acid treatment, dry htat, hot water, steam, etc.

U. S. Pat. 2,335,126, 1943 (Lilienfeld): degrading cellulose with acids, washing, drying and treating thereupon with alkalis to give solutions at low temperatures. These are brought to room temperature applied to textiles, and finally precipitated with acids.

Brit. P. 212,864, 1924 (Lilienfeld): solubilizing cellulose in alkalis by cooling the liquid for a short (precisely defined) time and warming to room temperature thereupon.

Other references:

Dissolving cellulose in quaternary ammonium bases e.g. benzylpyridinium chloride or similar agents has been described in U. S. Pat. 1,943,176 (Ciba).

G. P. 643,742 (I.G.) recommends degrading alkaline suspensions of cellulose by a treatment with oxygen containing gaseous mixtures.

Dyeing Apparatus with Improved Means for Dyebath Circulation C, 6

U. S. Pat. 2,482,319
(Marcel Cassé, Sept. 20, 1949)

Machines for dyeing and otherwise treating loose materials such as skeins, stockings and the like, generally contain a perforated bottom for sucking the dye liquid and an axial funnel for delivering the circulating liquid by pouring it from the top over the material. In reversing the direction of the flow, the liquid is withdrawn by the axial funnel and driven through the perforated bottom. The movement causes frequent slackening of the circulation due to congestion of goods. The bath quantity flowing from the funnel might not be sufficient to submerge the material located on the outer wall of the vessel, and finally the central funnel can be a hindrance by itself in placing and removing the treated goods. These problems are said to be solved by the present invention, characterized by circulating the dyebath in a closed circuit through a vat containing the material and communicating by perforated partitions with the dyebath container which forms the outer enclosure of the vat (Fig. 1).

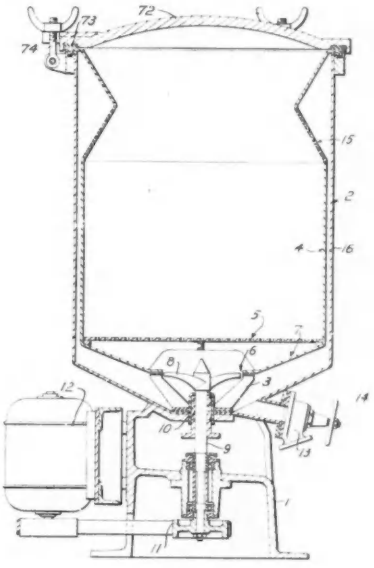


Fig. 1

This enclosure may partly or completely surround the vat containing the textile material. In Fig. 1, the inner vat (4) is connected with the outer vat (2)—e.g., the dye liquid container—through the perforated false bottom (5) and in the upper part by a perforated zone (15) which is of a truncated shape, preferably a frustocone. It is characteristic of the invention that these two perforated areas are of equal surface so as to obtain similar operating conditions with no differences in pressure during circulation of the bath in both directions. When the propeller (8), placed beneath the false bottom (5) to drive the dyebath through the vat (4), rotates in one direction, it sucks the liquid through the bottom (5), delivering it through the annual chamber (16) formed by (2) and (4) and through perforations at (15) into (4). The

liquid must uniformly and completely travel through (4). On the other hand, by reversing the rotation of the propeller (8), the bath is sucked through (15) and (16) and driven through (5) into the vat (4). It is essential to note that the dye liquid passes equally in both directions through all parts of vat (4). No local congestions can occur here as is possible in using the dyeing apparatus of the older type, operating with central funnels.

References cited by the Patent Office, among others:

U. S. Pat. 1,943,175, 1934 (Brit. Cotton & Wool Dyers Ass'n.): the vat is divided in two compartments: one for dyeing and the other one containing a propeller which is movable in both directions.

U. S. Pat. 1,902,165, 1933 (Hansen): a washing machine consisting of an outer and inner casing, the latter communicating by a plurality of perforations with another chamber in which a propeller rotates to drive the treating liquid through the goods.

Crease Resistance—Testing Methods and Apparatus H, 2, 02

U. S. Pat. 2,482,470
(American Cyanamid Co., De Waard-Stock, Sept. 20, 1949)

Reference is made to U. S. Pat. 2,479,303, assigned to the same company by Book and Fluck (see REPORTER, 1949, p. 766) comprising an apparatus for measuring the crease resistance of textiles without touching the specimen by hand during the determination of the creasing angle. The present method consists of: folding the material to be tested by means of rollers exerting a predetermined pressure, dropping the material into a support in the form of a sharp horizontal edge, measuring the creasing angle formed by an illuminated and graduated disc after recovery by means of a protractor, finally ejecting the sample mechanically to make place for the following test. This invention can best be understood by the drawings. The apparatus contains two

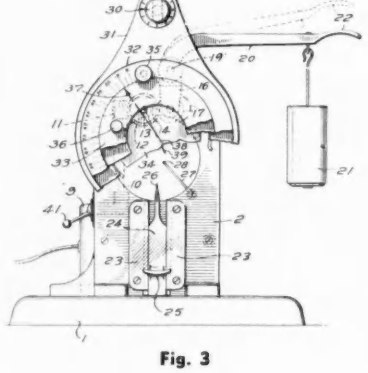


Fig. 3

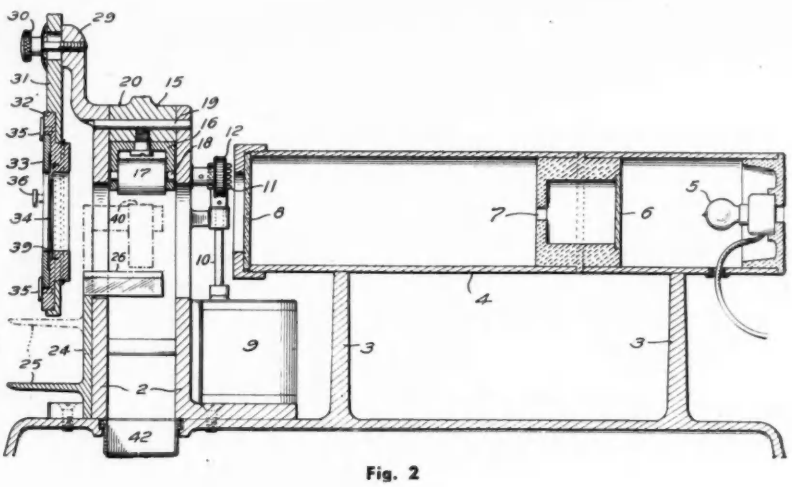


Fig. 2

rollers (See Fig. 3). One of them (14) is driven by a motor, the other one (17) being idle and rotating on stub shaft (18). These two rollers can be seperated by lifting handle (22) and removing handle (17) in order to insert the specimen. Then a certain weight (21) is fixed on the bell crank (20), bringing both rollers in contact. The specimen is mechanically folded by the rotation of (14) and (17) and dropped onto the edge (26) which is raised to the center of the illuminated disc (34). An inner ring (33) bears a fixed wire (39) which points at the outer ring (32) provided with annular markings. Ring 33) carries an arrow (37) with an extension (38)—see Fig. 4. The

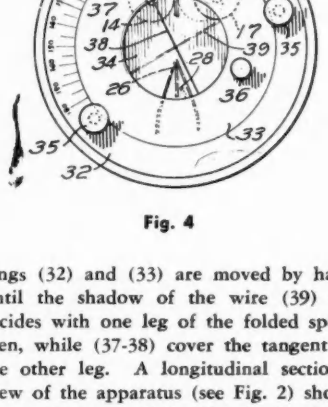


Fig. 4

rings (32) and (33) are moved by hand until the shadow of the wire (39) coincides with one leg of the folded specimen, while (37-38) cover the tangent of the other leg. A longitudinal sectional view of the apparatus (see Fig. 2) shows the ararngement of the illuminating lamp (5) provided with two heat filters (6) and (8). After the measuring of the creasing angle at the apex of the sample, it is lowered by the manipulating handle (25). The specimen is caught by a protruding member (28)—see Fig. 3, tipped over, and dropped into the basket (42).

References cited by the Patent Office, among others:

U. S. Pat. 1,491,944, 1924 (Francke): a method for testing materials by subjecting the test specimen repeatedly and intermittently to a series of flexure stresses and measuring the final deformation at the end of these deflecting operations.

U. S. Pat. 1,233,222, 1927 (S. D. Warren & Co.): a machine for applying a folding test to paper, clamping the specimens, and folding and unfolding them over a sharp angle until the paper breaks.

Oiled Silk Finish—Two-Step Process G, 2, 01

U. S. Pat. 2,478,974
(Celanese Corporation of America, Mellor, et al., Aug. 16, 1949)
(Probably corresponds to Brit. P. 591,594, 1947)

Textile fabrics are often impregnated with drying oils, rubber, natural or synthetic rubber-like compositions, cellulose esters or ethers, etc. A typical material of this type is the product, known as "oiled silk" in the trade, manufactured by coating or impregnating a silk fabric with a drying oil (boiled linseed oil) and allowing the cloth to dry in the air. This style has often been imitated by using rayon or acetate of cellulose fabrics as substratum. It happens, in this event, that several of the yarns contained in these goods appear opaque in reflected light after this treatment, thus impairing the character of the otherwise translucent fabrics. The inventors observed that this disadvantage can be overcome by first subjecting the goods to the action of water, and following by an immersion in a hydrophobe organic liquid. Thus, the fabric is first moistened by any of the known methods (for instance, by wet steam) and

then immediately passed through an organic hydrophobe solvent such as perchloroethylene. This operation can be repeated, if necessary, in continuous sequence. After leaving the last solvent bath the goods are dried, immediately oiled by conveying through cold boiled linseed oil and optionally through a plasticized cellulose ether solution, and dried again at 90-95°C. A modification of this process consists of replacing the first (aqueous) impregnation by a mixture of water and a water miscible organic solvent, (e.g., acetone), before passing through the hydrophobe solvent. Here the acetone seems to act as an intermediate (auxiliary) solvent. No theoretical explanation of this unexpected phenomenon, termed as "clarification," has been offered. All kind of cellulosic material such as cotton, viscose rayon or acetate of cellulose can be treated this way but the process is said to be of particular value in processing highly stretched and completely saponified acetate fibers worked into fabrics. The yarns are known in the trade as "Fortisan." The use of this kind of high tenacity yarns, made into fabrics which have to be transformed into oiled fabrics, has been covered by the same company's U. S. Pat. 2,370,946.

References cited by the Patent Office, among others:

U. S. Pat. 2,352,747 (Celanese): preparing a fabric to be coated with a plasticizing agent to attain a firm bond between the fabric and the coating composition.

U. S. Pat. 2,137,404 (Wacker Ges. f. Elektrochem. Ind.): removing water from various materials by immersing them in a hydrophobe solvent (benzene) to which an emulsifier is added. Finally, the goods are dried.

U. S. Pat. 2,053,766 (Dreyfus): production of high tenacity yarns by stretch-spinning acetate of cellulose and saponifying completely at 85°C.

U. S. Pat. 2,036,424 (Eastman Kodak): preliminary wetting of cotton threads (for instance, with alkalis) and treating thereafter with organic solutions of cellulose ethers or esters to promote penetration.

Other references:

B. P. 441,162 (Hydrierwerke): a two-step process involving an impregnation with lower (water-soluble) alcohols followed by immersion in oil emulsions. This method, however, seems to be principally intended for softening rayon fabrics.

Scouring and Bleaching Wool in the Same Operation—Sodium Chlorite Added A, 2, 01

U. S. Pat. 2,481,205
(Mathieson Chemical Corporation, Dubeau, September 6, 1949)

In scouring wool by the conventional method, it can be shown by taking samples of liquid from the *first washing* bowl (where about 90 per cent of the scouring operation is accomplished) that the proportion of carbonate converted to bicarbonate increases progressively during the washing process. This decrease in carbonate content and increase of bicarbonate means a less efficient scouring effect, or at least, an uneven treatment of the material. The object of the present invention is to keep the ratio of Na_2CO_3 to $NaHCO_3$ in constant proportion, within certain limits by adding a small amount of sodium chlorite to the scouring bath. Under this condition the ratio remains substantially between 1 (Na_2CO_3): 0.5 ($NaHCO_3$) and 1: 1.2 during the whole procedure. Moreover, chlorite exerts, at the same time, a bleaching action and prevents the material from becoming as harsh as in peroxide bleaching treatments. The amount of sodium chlorite can be as low as 0.01 per cent and as high as 2 per cent (by weight of available chlorine). Satisfactory results are reported, using concentrations of 0.02-0.03 per cent available chlorine.

References cited by the Patent Office, among others:

U. S. Pat. 2,183,142 (American Chemical Patent Corporation): a wool washing process consisting of detergent treatment, withdrawing part of the solution, and heating until separation in two layers occurs in this portion.

U. S. Pat. 1,254,727 (Paulson): bleaching textiles with a composition of soda ash and bicarbonate to which some hypochlorite is added. This process is not specific for wool, rather for cellulosic material (ordinary paper mass, printed newspaper, etc.).

Other reference:

Brit. P. 561,475 (Imperial Chemical Industries): wool treated with chlorites for rendering the material resistant to felting.

Water Repellent Fabrics—Zirconium Salts in State of "Co-ordination" G, 2, 02

U. S. Pat. 2,482,816
(National Lead Company, Van Mater, September 27, 1949)

The present invention comprises water repellent finishes obtained by incorporating water soluble zirconium compounds into fibers and insolubilizing them in a second step. The method is based on the theoretically established fact that certain hydrated compounds of zirconium sulfate ($Zr(SO_4)_2.n\ H_2O$) are really present in the form $ZrOSO_4.H_2SO_4.(n-1)H_2O$. Thus, in a special dissociated state, this form is termed a coordination compound. It is assumed that the aforementioned zirconyl compounds, considered generally as neutral salts, contain in fact a basic zirconyl radical of the formula $Zr.O.OH^{+1}$. This theory is supplemented experimentally by treating the reaction's product of water-soluble zirconyl oxychloride $ZrOCl_2.7\ H_2O$ with a water soluble stearate. The zirconyl soap, can be extracted with methanol, whereby free stearic acid (one mole) is separated from (one mole) basic zirconyl stearate $ZrO(OH)C_{17}H_{35}.COOH$. In dissolving zirconyl acetate in excess acetic acid, a water-soluble basic zirconyl acetate results, stable up to 40°C. and hydrolyzing at higher temperatures to the insoluble compound. This property is used to render textiles water repellent. One method is by impregnating a fabric with the acetic acid coordination compound — $ZrO(OH)CH_3COO.CH_3COOH$ — then hydrolyzing this product completely on the fiber by a steam treatment and finally drying at 100-105°C. Another method is an aftertreatment with an alkaline salt (e.g., borax) which causes precipitation of the basic zirconyl acetate $ZrO(OH)\ (CH_3COO)$. Other examples call for adding sulfanilic acid to the acetate coordination product for stabilizing the solutions. Colloidally dispersed basic zirconyl salts of higher fatty acids, for instance $ZrO(OH)(C_{17}H_{35}COO)$, for impregnating fibrous materials are also recommended.

References cited by the Patent Office, among others:

U. S. Pat. 2,345,142 1944 (Mueller): waterproofing with aqueous emulsions containing water soluble metal salts (e.g., Zr) in the continuous phase and waxes or oils in the dispersed phase. The metal salts must be on the basic side. No protective agent is added.

U. S. Pat. 2,328,431 (General Aniline): water repellent impregnation with an emulsion of zirconium oxychloride + paraffin wax, fatty acid and Emulphor. The hydrophilic substance is removed by washing while the insoluble components remain in the fiber.

U. S. Pat. 2,316,141 1943 (Titanium Alloy): attaining water-soluble zirconium salts of definite constitution by stirring zirconium carbonate into mineral acids.

U. S. Pat. 2,316,057 1943 (General Aniline): impregnating with zirconium oxychloride or— acetate + sodium acetate and drying at 100°C. with or without combining with a soap impregnation.

Other references:

U. S. Pat. 2,424,262 (Titanium Alloy): dissolving zirconium oxychloride in water, precipitating with soda ash and dissolving the precipitate in acetic acid.

U. S. Pat. 2,323,387 (Pond Lily Co.): impregnating textiles with zirconyl salts to form the hydroxides within the fiber and applying a paraffin dispersion in a second step.

TRADE NOTES • NEW PRODUCTS

Portable Water Bath

• New Fisher Products

A valuable feature of a new Portable Water Bath which weighs only 24 lbs. is a novel device which prevents it from "going dry" according to Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa. The bath accommodates a wide variety of laboratory glassware, and incorporates integral rod-and-clamp arrangement.

The product, 15" in diameter by 7" high, has a Monel exterior and tinned copper interior for resistance to corrosion. It employs two immersion type heaters, either or both of which can reportedly be used for low or high heat.

Concentric rings, conveniently marked for various sizes of flasks are provided as well as a test tube holder which is said to accommodate up to 14 tubes. A special bottle-feed device prevents the bath from "boiling dry" for as long as 10 hours on low heat and 4 to 5 hours on high heat, the company states.

The usefulness of another Fisher product, Laboratory Calgonite, in cleaning glassware, porcelain and other laboratory utensils is reported greatly improved through the incorporation of a synthetic wetting agent.

The wetting agent is said to enhance the value of the compound by reducing surface tension, thereby permitting the washing solution to remove dirt more efficiently. The compound, especially developed for laboratory use, also contains "Calgon" which reportedly softens tap water to rain-water purity. It is said to stop formation of "scum" by preventing combination of calcium and magnesium with soap to form insoluble salts. Improved Calgonite also is said to minimize the need for rinsing.

• Tinsley Elected Division Chairman

John S. Tinsley, research group leader of the Hercules Powder Company, Wilmington, Del., has been elected chairman of the American Chemical Society's Division of Cellulose Chemistry. He succeeds Dr. Rollin F. Conaway, of the Rayon Department of E. I. du Pont de Nemours & Company, Waynesboro, Va.

Dr. Wayne A. Sisson of the American Viscose Corporation, Marcus Hook, Pa., was named vice-chairman of the Division and Dr. W. E. Davis of the Hercules Company was re-elected secretary-treasurer.

Dr. Conaway and Dr. J. L. McCarthy, of the Department of Chemistry at the University of Washington, Seattle, were named to the Division's executive committee and Dr. C. M. Conrad of the Southern Regional Research Laboratory, New Orleans, was elected to the Society's National Council.

• PTI Volunteer Action

In cooperation with the American Friends Service Committee, the 530 students of the Philadelphia Textile Institute volunteered to collect clothing and piece goods in the Germantown area for a Christmas shipment to the needy persons over seas. The clothing collected in this drive will be designated for shipment to the needy areas in France.

The culmination of this drive took place on December 9th at the School's first Annual Christmas Dance held at the Cedarbrook Country Club.

• Diamond Alkali Booklet

"The Story of the Chemicals You Live By," a new, 16-page booklet describing eight major groups of chemical products and depicting their utilization throughout industry—has been issued by Diamond Alkali Company, 300 Union Commerce Building, Cleveland, Ohio.

Written in simple, nontechnical terms this illustrated booklet reviews soda ash, caustic soda, chlorine, bicarbonate of soda, silicates, calcium carbonates, chromates, and specialty chemicals, pointing up the economic significance of each group.

Copies of this "primer" on basic alkali chemicals, their derivative specialized materials, and their co-products are available free on request by writing to Diamond's nearest district sales office or general headquarters.

• Molded Pail for Handling Corrosives

A new molded pail, utilizing a virgin rubber base compound and other original features with an aim for greater safety and serviceability in the handling of acid and alkaline chemicals, has been developed by Stokes Molded Products, Inc., Trenton, N. J.

Suggestions from chemists and industrial workers, whose duties require the use of chemical-resistant vessels, were utilized by engineers in Stokes' research and development division in the design and construction of the three-gallon pail.

The virgin rubber compound is said to give the pail greater resistance to corrosive chemicals, abrasion and heat than conventional compounds. The new Stokes compound will not crack or chip, according to the manufacturer.

Described as light, shock resistant, rigid, and almost chemically inert, the new Stokes pail is equipped with a unique bail-type handle of lead plated stainless steel with a hard rubber grip. To assure smooth leverage, the pail is mounted in cast lead bearings molded into the bucket to prevent it from pulling out of place.

Other safety features are the pouring lip which reduces drip and the molded tipper on the bottom of the pail which reportedly provides a firm hold for accurate control in pouring hazardous contents.

The pail is supplied with graduated markings for measuring one to 12 quarts or one to three gallons.

Further information may be obtained by writing to Stokes Molded Products.

• T.R.I. Fellowship Citations

Three Founding Fellows of Textile Research Institute were given the first "Fellow of T. R. I." citations at the Institute's Scientific Day luncheon on December 1st.

The three scientists, the first to be elected by the Institute Board of Directors to this honor class are: William D. Appel, Chief of the Textiles Section, National Bureau of Standards, Frederic Bonnet, Technical Advisor on Special Assignment of the President, American Viscose Corporation, and Edward R. Schwarz, Head, Textile Division, Massachusettts Institute of Technology.

The Institute Membership authorized the honor class of membership "Fellow of Textile Research Institute" at its Nine-

teenth Annual Meeting in November, 1948. In January this year, President Ashcroft appointed a planning committee to define requirements of admission. Members of this committee were: R. T. Kropf, Chairman, Joseph Brant, Miles A. Dahlen, J. H. Dillon, and J. B. Goldberg.

Among the stipulations for admission as a "Fellow of T. R. I." is the requirement that a person shall have high proficiency in textile technology of either research, consultation, writing, teaching, design, construction, or production.

The feature luncheon on December 1st, was announced as "Fellow of Textile Research Institute Luncheon." Dr. John H. Dillon, Director of Research of the Institute and Textile Foundation presided. Mr. Ashcroft presented the scrolls to Messrs. Appel, Bonnet, and Schwarz.

William D. Appel graduated with honors in Zoology and Chemistry at the University of Chicago in 1917. Following his graduation he held positions as research chemist with the Federal Dyestuff & Chemical Corporation, Ault & Wiborg, and the Newport Chemical Company. In 1922, he became associated with the National Bureau of Standards as dye chemist in the Division of Chemistry. In 1924, the American Association of Textile Chemists and Colorists established a research associateship at the Bureau under Mr. Appel's direction. In 1929, he was promoted to his present position of textile technologist and chief of the Textiles Section at the Bureau. He has published a number of technical papers and has been active in the work of many associations. He served as President of American Association of Textile Chemists and Colorists 1944-1946, and Member of Committee on Research since 1944. He has been Chairman, since 1929, of the Subcommittee on Test Methods of Committee D-13, American Society for Testing Materials. He also has been actively interested in the work of the Textile Research Institute and the Textile Foundation.

Frederic Bonnet graduated with degree of B. S. (Cum Laude) in Chemistry at Washington University in 1899, and received his Ph.D. degree at Harvard in 1903. After several years of teaching, which included State University of Iowa and Worcester Polytechnic Institute, he became Chief Chemist of the U. S. Ammonium Nitrate Plant in Perrypoint, Maryland. Earlier in his career, Dr. Bonnet became interested in the early development of "artificial silk." He was with the Atlas Powder Company as Director of their Experimental Laboratory in Wilmington, Delaware, from December, 1918, to October, 1925. During this period, he made several trips to Germany as head of a technical group to investigate a cuprammonium process for making "artificial silk". In 1920 he technically operated for about three months a German plant making "artificial silk" by this process, with a view to obtaining working details for the Atlas Powder Company. In October, 1925, he joined the American Viscose Corporation—developing a complaint service department which became The Textile Research and Standard Dept., and subsequently the Standards Department when the Textile Research Department was established in 1939. In May, 1946, he retired as Director of the Standards Department to become technical advisor to the President of the American Viscose Corporation for special assignments.

Edward R. Schwarz, educator and scientist, has made many contributions to the development of research in the textile industry. Upon graduating from the Massachusetts Institute of Technology in 1923, he was made Research Assistant at the Massachusetts Institute of Technology Textile Laboratory, becoming Assistant Professor of Textile Technology in 1929, Associate Professor of Textile Engineering in 1934, and Professor of Textile Technology as well as Head of the Textile Division in 1937. Professor Schwarz pioneered in the application of the microscope to textile work, particularly in regard to the study of fiber properties. He published a book entitled "Textiles and the Microscope" (McGraw Hill Book Company, 1934). Professor Schwarz has introduced a number of new concepts in physical testing techniques, and has been responsible for the development of new testing apparatus among which are the M.I.T. abrasion tester, the drapemeter and high-speed tensile testing machine. He is largely responsible for the recognition of the influence of the time factors in textile testing. He has pioneered in the application of simplified mathematics to the solution of complex problems. His work in the above fields led to the establishment of the Samuel Slater Memorial Research Laboratory as a gift to M.I.T., with the honor of directing the activities falling to Professor Schwarz. He has published and lectured widely. Professor Schwarz was a Charter Member of the Textile Research Institute, a member of the Board of Directors from 1935 to 1945, and Vice President of T.R.I. 1935-40. He holds memberships in honorary scientific and engineering fraternities, is a Fellow of The Textile Institute, Manchester, England, and has been active in a number of other associations. In 1947, he was awarded the Olney Medal by the American Association of Textile Chemists and Colorists.

Hellwig Pallet Rack System

• Hellwig Attacks Storage Problem

The Hellwig Dyeing Corp., Philadelphia, Pennsylvania, large commercial piece-goods dyers, recently attacked a two-fold problem through the installation of a large and well-planned pallet rack system.

After a single entry rack had been installed, Hellwig reportedly found they could handle about 2½ times as much material as they could before in the same amount of space. This led to the erection of six additional double racks. Increased efficiency was reported in that aisles became less congested and materials were more readily stored and located.

These two installations brought such gratifying results that still another large rack was installed which increased the over-all efficiency of the operation to a point where, it is said, they can handle 3 times the material originally possible.

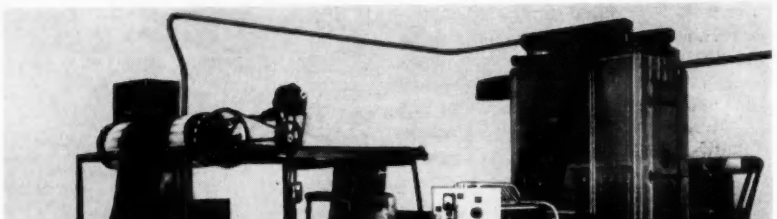
The racks are reported built of completely adjustable and re-usable Unistrut all-purpose metal framing.

• Waterway Projects Appointment

Waterway Projects, Inc., 1012 N. Highland Ave., Los Angeles, Calif., developers of Soft-Flex processed glass fabrics, announce the appointment of Angus H. Roberts as Superintendent of their Hand Prints Division. Mr. Roberts, a graduate of Lowell Textile Institute, was formerly Chief Chemist and Colorist with California Hand Prints, Inc., Hermosa Beach, California.

• McKiernan-Terry Sales Representative

William F. Campbell, Vice President of McKiernan-Terry Corporation, Harrison, N. J., announced the appointment of Laurie Whittelsey of Macon, Georgia, as Sales Representative for the company's line of textile dyeing and finishing equipment consisting of dye becks, padders, agers, ranges, and calender rolls. Mr. Whittelsey will cover North Carolina, South Carolina, Georgia, and Alabama.



Continuous Vat-Craft Dyeing Set-Up at Shamrock Textile Processing Company

• Vat-Craft Dyeing Process Revealed

Vat-Craft Corporation, New York, 547 West 110th St., has revealed a new textile dyeing process which promises to have an important effect on the handling of many types of textile fabrics. The process is said to make it possible to vat-dye many types of apparel fabrics photochemically by use of a radio-active source material, UA-1.

The new process, which reportedly has been 2½ years in development by Vat-Craft, holder of all machine design and patent rights was demonstrated on December 7 at the Shamrock Textile Processing Company, Paterson, N. J., where the only Vat-Craft machine is located at present. Several more machines are expected to be completed early in 1950, it is stated.

Two leading textile firms have identified themselves with the process. American Viscose, in an advertisement to the trade, expressed confidence in the process and indicated continued cooperation in its development. Burgess Fabrics announced a new faille fabric processed by Vat-Craft and available to manufacturers. The former has stated that two important advantages are attained with solid color runs of viscose rayon, using the process. First—the method of vat-dyeing viscose without appreciable tension or distortion . . . creating a full, natural and live hand. Second . . . there can be no migration of color or "tailing". Burgess joins in lauding the uniformity of color achieved in blends as well as the positive performance against gas—and wash-fading in acetates of normally erratic stability.

In the Vat-Craft process, fibers are coated or impregnated with soluble materials, which upon exposure to radiation, are converted to insoluble colored pigments. These are said to become an integral part of the fabric and penetrate completely through the fiber rather than merely coating it as heretofore in textile dyeing.

It is stated that the process, to be economically feasible, can proceed at varying rates of speed depending upon the fabric being dyed. In order to accomplish this, addition agents are included in the dye solution which coats the fabric. The addition agent reportedly acts similar to a radio amplifier which takes small amounts of electrical energy and increases and converts this energy to a state that is easily perceived, i.e., sound waves from a loud speaker.

This catalytic addition agent, designated as catalyst UA-1, is reportedly manufactured from radio-active source materials under a license from the United States Atomic Energy Commission.

It is said that exceedingly small amounts of this compound, when added to the solution coated on the fabric, will increase the efficiency of outside radiation many thousandfold to a point where color can be precipitated on almost any material at high rates of speed.

The Vat-Craft machine is composed of four basic units. The first unit, the Padye, consists of a shallow pan and several wringers known as Nip-rollers. As the fabric goes through this first unit it is soaked with the dye solution which also contains the radio active source material, UA-1. After the fabric has been saturated the Padye nip-rollers squeeze out the excess dye.

The second unit through which the fabric passes is Quetsch Number 1. Here the fabric goes through a second shallow pan containing a photo-sensitizing solution which leaves the fabric coated similar to an undeveloped camera film. Again the fabric goes through nip-rollers which wring out the excess solution.

The third unit in the Vat-Craft process is the Development Chamber. It is about 15 feet high, six feet wide and four feet thick. It contains two vertical rows of fifteen powerful lights each. These two tiers of lights face each other about a foot apart and each tier has a screen of 96% silica glass in front of it. The fabric passes down through this development chamber between these two screens of silica glass at which point it is said to be developed like film.

The 30 lights reportedly produce 3750 watts each for a total of 112,500 watts, the largest known man-made concentration of light in the world. The silica glass screens are said to permit filtering of proper light rays to develop the fabric's color and yet control the temperature of the area through which the fabric passes to between 90 and 100 degrees.

When the fabric leaves the bottom of this development chamber, the color is claimed completely set.

It then goes through the fourth unit of the process which is Quetsch Number 2, a fresh water bath which is designed to remove any lint, excess solution or particles of dust or dirt. It is wrung out on more nip-rollers and goes into a hamper or onto a spool. The fabric is then ready for normal textile finishing.

Between the several units of the Vat-Craft machine there are tension-controlling devices which are said to allow the fabric to be run at whatever tension is desired, or if necessary, completely without tension. The compensating gates which perform this function are important due to the high speed at which the process operates.

The Shamrock Plant covers about half of a normal city block and employs about 75 men. The standard dyeing equipment manned by the 75 men is said to produce approximately 90,000 yards of fabric daily in two ten-hour shifts. The one Vat-Craft machine, about forty feet long, six feet wide and fifteen feet high, manned by three or four workers, is said to produce vat dyed fabrics at the rate of 125 yards a minute or 150,000 yards in two ten-hour shifts.

William L. Cavanaugh of Shamrock mentioned that he was prepared to accept orders (minimum 5,000 yards) at a cost comparable with other vat-dyeing processes.

Under supervision of Dr. Leonard E. Ravich, Vat-Craft's Vice President in Charge of Research, test runs reportedly have been made in the vat dyeing of nylon dobbies, Orlon dobbies, eight ounce cotton twill, acetate and rayon tissue faille types, all rayon gabardine in both dress and shirting weights, one denier poplin shirting, a multifilament crepe blend of acetate and nylon, an all acetate bridal satin and a fine silk crepe. Work with dark shades is not as ad-

vanced as light and medium shades at present, it was stated.

John M. Gessler, President of Vat-Craft, said that the first machine had been constructed to handle fabric 57 inches wide at speeds up to 115 yards a minute. He pointed out however, that it was possible to make the machines wide enough to handle fabrics 92 inches in width. He also said he is ready to grant licenses now. (Officials state that the firm will license the system on a yardage basis, a program patterned after that used on the Sanforized process, though it is pointed out that the rates will be different.)

Mr. Gessler stated further that during the development stages of the Vat-Craft process the following firms assisted in the research studies:

American Viscose Corporation, General Electric Company, Corning Glass Works, Van Vlaanderen Machine Company, Proctor & Schwartz, Shamrock Textile Processing Company and the United States Atomic Energy Commission.

Officers of the Vat-Craft Corporation are: John M. Gessler, President; Dr. Leonard E. Ravich, Vice President in Charge of Research; Fred C. Billing, Vice President and Tresaurer; Edward P. Field, Jr., Secretary; Richard D. Nelson, Assistant Treasurer; Vincent Broderick, Assistant Secretary.

Members of the Board of Directors are: Mr. Gessler of John M. Gessler & Sons, Philadelphia; Mr. Field; Dr. Ravich; Mr. Billing; Mr. Nelson, Assistant Vice President, Equitable Securities Corporation; Stewart Cragin; Harry L. Schimpf, Jr. of Schimpf & Steeley, Philadelphia, attorneys; Harry L. Dalton, Vice President of American Viscose; John J. Hosey, Jr., Vice President and Treasurer of Energetic Worsted Company.

• New P. & G. Research Laboratory

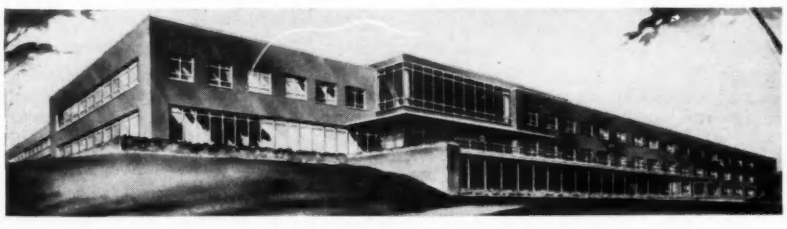
Plans for the construction of a new research building near Venice, Ohio were announced by Richard R. Deupree, Chairman of the Board of The Procter & Gamble Company.

The two-story research building, according to the announcement, will house the most modern research equipment and laboratory facilities and will permit a material increase in the company's research and development activities. The general plan is reported completed and preliminary engineering on the building well underway. It is hoped that the building will be ready for occupancy in about two years. The company estimates that the building will cost at least $1,500,000.

"This building," according to J. G. Pleasants, Vice-President in Charge of Manufacture, "has been made necessary by the growth of our business and the need for more facilities to carry on the basic research and development work which is such an important part of our never-ending search for products that will serve the public better."

In extending its laboratories to an outlying area, Procter & Gamble is following the practice which many industries have found desirable in that it permits the proper part of its research and development work to be separated from its manufacturing activities. "We feel that our scientific men will find in this new installation an environment ideally suited for good research work," Mr. Pleasants said.

The new building will be situated on a 200 acre tract of land which the company acquired last April.

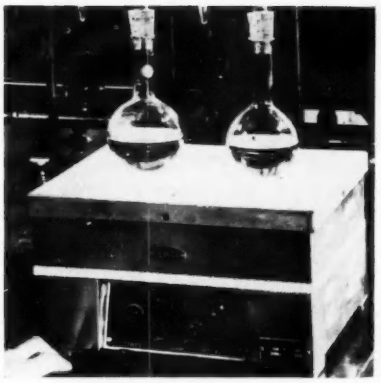


Architect's Drawing of New P. & G. Building

• New Laboratory Hot Plate

A new laboratory hot plate which is said to be far superior because it provides stepless heat control and incorporates valuable design features, is now available from the Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa., in 12" x 12" and 12" x 24" sizes. The "Temco" Hot Plate, after attaining a surface temperature of 500°F. reportedly consumes current only 50% of the time (unlike heaters employing rheostats), and its heating elements are said to be completely embedded for safety.

Temperatures can be maintained within close limits over the range 140 to to 850°F. and the elements are of flat type which prevent "cold" spots, the company states. The lower portion, housing controls, is reported to be separated from cast aluminum top plate by "Trancell" insulation, and louvers are provided to help carry any heat away from table top. The new heater is furnished either for 115 volt or 230 volt operation.



Fisher Laboratory Hot Plate

• New Fiber By Avisco and Monsanto

The new fiber being developed by the Chemstrand Corp., jointly owned by American Viscose Corporation and Monsanto Chemical Company, has "many of the same qualities as Orlon," according to William H. Brown, secretary, treasurer and a director of Avisco.

"Research of the two companies (Avisco and Monsanto) on this fiber has worked worked out very well," Mr. Brown said, "and it is expected that some of the fiber will be available for commercial testing in the next few months."

Mr. Brown stated that the "Filamatic" process developed by American Viscose Corp. for the continuous spinning of viscose rayon textile yarns will be installed with an initial capacity of up to 20,000,000 pounds a year. He further stated that the commercial type machine is now being designed.

• Hilton-Davis Lab Operating

The newly enlarged dyestuff laboratory is now reported in operation at the Hilton-Davis Chemical Company Division, Sterling Drug Inc., Langdon Farm Rd., Cincinnati, O. The air-condition laboratory has facilities both for routine testing and standardization of dyestuffs and for research looking toward development of new products and new methods of application, according to George N. Nickels, of the textile division's sales staff, in charge of its supervision.

• Morningstar, Nicol, Inc. Appointed Sales Agents

In a joint statement, Joseph Morningstar, President of Morningstar, Nicol, Inc. of New York, and Anthony J. Gabriel, General Manager of the New England Starch Company, potato starch manufacturers, announced that the former company has been appointed Sales Agents for the Houlton and Mars Hill, Maine, factories. This combines the sales of the New England Starch Company plants with the Aroostook Potato Products Company, a subsidiary of Morningstar, Nicol, Inc

The joint announcement reportedly means that high grade potato starch can now be offered, in sufficient quantity from a uniform source of supply at all times to textile and paper manufacturers. It has been estimated that about 80% of all the high grade starch produced in Maine is now made available to these fields of use by the new sales and servicing arrangement. In the field of textile sizings and stiffening of laces, netting, crinolines and other loosely woven fabrics, potato starch is reportedly without peer.

The Morningstar Sales staff, augmented by their subsidiary, Paisley Products, Inc., will provide additional sales and service throughout the country through Paisley sales offices located in principal cities.

• Graver Company Bulletin

Graver Water Conditioning Co., New York 11, N. Y. has outlined its products, services and background in a bulletin which has just been printed. The company, a development of the 40-year-old Water Conditioning Division of Graver Tank & Mfg. Co., Inc., has recently expanded its organization in greatly enlarged quarters. These include extensive laboratories and a new pilot plant for the purpose of research in water conditioning for boiler plant, process work, and general industrial and municipal use. The bulletin explains the scope of Graver activities in these fields, and is illustrated by some of the company's installations of hot-process and zeolite softeners, demineralizers, clarifiers, filters, etc. Copies of the bulletin can be obtained by addressing Graver Water Conditioning Co., Dept. 182, 216 West 14 Street, New York 11, N. Y., and asking for Bulletin WC-100.

• Geigy Release

Geigy Company, Inc., 89-91 Barclay Street, New York 8, N. Y. has issued a bulletin (No. 22-G, available on request) describing a recent addition to their Cuprophenyl line, Cuprophenyl Brown 2RL. It is said to give red shades of brown on cotton and viscose rayon with good fastness to perspiration and washing when aftertreated according to the company's recommendations. The product also reportedly possesses good resistance to light, only slightly reduced by resin anti-crease finishes.

The company states that it is now possible to use Cuprophenyl 2RL in various proportions with the yellow shade of Cuprophenyl Brown 2GL for producing a wide variety of fashion shades in brown.

• Centrifugal Pump Manual

A revised instruction booklet on the installation and operation of centrifugal pumps in corrosive service has been issued by The Duriron Co., Inc., Dayton 1, Ohio. While dealing specifically with Durcopumpst, the information in the twelve varnished, smudge proof pages is applicable to all centrifufal pumps. The booklet deals with proper location and, foundations for pumps, correct alignment, priming standard pumps, proper piping arrangements, adjustment of impellers, common troubles and how to overcome them, friction data, formulae for figuring capacity, head and horsepower, and conversion data.

Complete information can be had by writing The Duriron Co., Inc., and asking for Bulletin 812A.

• "Electronic Controls" Booklet

"Cutting Production Costs with Electronic Controls" a booklet made available by Photoswitch Incorporated, 77 Broadway, Cambridge 42, Mass., contains 45 case studies describing examples of cost-saving production techniques. This book includes no catalog information, and its 65 pages are said to contain facts showing how photoelectric and electronic controls solve problems and prevent bottlenecks in industry.

Each of these case studies describes an industrial control problem which has been solved through the use of electronics. To assist in quickly securing useful information, an index lists the application both alphabetically and by industries. Free copies of this book are available.

• Standard Fabricators Catalogues

Standard Fabricators, Incorporated, 255 Walton Avenue, New York 51, N. Y., has announced that those interested may receive copies of two catalogues by the company.

"Dyeing, Extracting and Drying Machines for Cotton Yarn" is a well illustrated booklet covering a history of package dyeing and stages of development as well as material on the following: combination beam and package dyeing machine with material carriers, cotton package dyeing machines, Stienen-Obermaier centrifugal pump and six-way valve, automatic control panel and reversing device, extractors and driers.

"Wool and Worsted Dyeing Machines" gives complete information on models of the company's dyeing machines for raw stock, worsted top, worsted top pot, worsted skein, and worsted package. A page is devoted to the Steinen-Obermaier hook-up system.

• Fire-Retardant Xmas Trees

The G. R. Kirk Company, Tacoma, Wash., has announced the Frosty Fir Christmas tree, which is chemically treated to have fire-retarding properties.

Kirk trees are uniform three-foot Douglas firs decorated with fluffy white plastic and rayon fibers. The wintry appearance of the Frosty Firs is a result of five years of research, and involves the use of Monsanto Chemical Company's Lustrex styrene latex and an emulsion including Monsanto's Aroclor.

These chemicals furnish a suitable coating for the trees and, at the same time, are reported to retard wilting and needle dropping. The coating is said to also form a base for the flame-retarding fibers which give the trees their snowy look.

The Frosty Fir comes with a special liquid-containing base which reportedly insures longer life and a fresher appearance for the Yuletide season.

• Rodney Hunt Booklet

Rodney Hunt Machine Co. of Orange, Massachusetts, manufacturers of textile wet finishing machinery, has published a new brochure devoted entirely to their "Tensitrol" washers. By means of working drawings, photographs, comparative cost tables, and on-the-job-test results, this publication presents a complete picture of the Rodney Hunt invention.

The "Tensitrol" principle is described as a "variable traction of all the drive rolls on the fabric, the amount being determined automatically by the behavior of the cloth itself as it travels through the machine."

A free copy may be obtained by qualified persons by writing on their company letterhead.

Dr. G. Nathan Reed

• LTI Dean Assumes Duties

Dr. G. Nathan Reed, recently Head of the Organic Chemistry Division at the Institute of Textile Technology, Charlottsville, Virginia, has taken over the duties of Dean of Faculty at the Lowell Textile Institute, according to an announcement by President Kenneth R. Fox.

Dr. Reed succeeds Dr. Simon Williams, who resigned from Lowell Textile Institute to accept a post-doctorate fellowship at Harvard University.

Dr. Reed was born at Campbell, Texas and received his Bachelor's and Master's Degree from Oklahoma A. & M. College. He took his Ph.D. at Kansas State College in 1938. His teaching posts besides the Institute of Textile Technology include the University of Oklahoma, University of Colorado and Kansas State College.

During World War II he served in the chemical warfare service of the U. S. Army and rose to the rank of Lieutenant Colonel. During this period he carried out valuable research work in insecticides and insect repellents.

Some of his most important research has been in the study of starches and modified starches, and he has designed instruments to control the viscosities of starches for starch manufacturers.

Dr. Reed holds membership in numerous professional societies including Phi Lambda Upsilon, Sigma Xi, The American Chemical Society, and the American Association of Textile Chemists and Colorists.

• Rug Dyers Merge

Two leading rug dyers will join forces on January 1st when a new firm, Lincoln-Hudson Rug Dyers, Inc., will commence operations. The new company, according to a joint announcement by Harry A. Gross and Henry Mahler, presidents of Lincoln Rug Co., Inc. and Hudson Rug Refinishing and Cleaning Corp. respectively, will combine the rug dyeing operations of the two companies.

While both the Lincoln and Hudson companies will continue to operate independently insofar as their other rug servicing and merchandising activities are concerned, they will consolidate their dyeing equipment and facilities in the new corporation, which will be located in the present Lincoln plant at East Newark, New Jersey. It is said that the Lincoln-Hudson Company will draw on the experience of both parent companies, and will carry on the same specialized services of custom-dyeing new carpeting and re-dyeing old.

Eugene W. Mahler, former Army officer and graduate of Columbia University's School of Business Administration, will be president of the new concern. He has been in charge of Hudson Rug's dyeing department for the last four years. Peter Gross, an executive of Lincoln Rug Co., will be vice president of Lincoln-Hudson. A graduate textile chemist, he attended Lowell Textile Institute and Massachusetts Institute of Technology. He has been associated with Lincoln Rug since 1930, and has been responsible for the development of its rug dyeing service.

Lincoln-Hudson Rug Dyers, Inc., will be located at 900 Passaic Avenue, East Newark, New Jersey. This is the present address of Lincoln Rug Company, which is moving soon to a newly acquired building in Newark. Hudson Rug Refinishing & Cleaning Corp. will remain at 500 East 164th Street, New York, N. Y.

• Vinylite Plastic Window Shades

New window shades are made possible through the development of a new Vinylite plastic film specifically formulated for the window shade market.

This new Vinylite plastic, developed by Bakelite Corporation, reportedly combines the qualities of toughness and durability with a smooth and lustrous finish.

Known as Plastishades, the finished window shades are produced by the Charles W. Breneman Co., Cincinnati, O., and are said to have successfully withstood rigorous testing, including severe laboratory examination by the United States Testing Company, Inc. The new shades are reported to reduce maintenance work to a minimum in that they can be easily and thoroughly cleaned by using soap and a damp cloth or sponge. The six-mil (.006 of an inch thick) material is unaffected by moisture, mildew or insects, will not tear or puncture in normal use and does not support flame, the company states. They further state that the Vinylite plastic material is resistant to fading, crocking, shrinking and staining, does not ravel and has no filling to break or fall out.

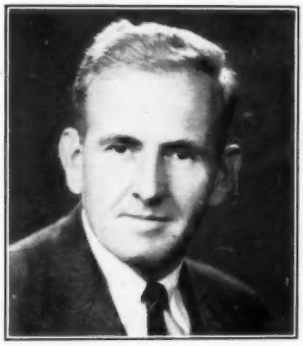


Photo by Filene's Photoreflex

Arthur I. Anderson

• Anderson to Consulting Staff

H. J. Wollner, President of the American Conditioning House, Inc., Boston 10, Mass., announces the addition of Arthur I. Anderson to the staff of his textile consulting organization.

Mr. Anderson, for fourteen years a member of the staff of the American Institute of Laundering, has been appointed Coordinator of Textile and Laundry Testing and Research. He was graduated from Lowell Textile Institute in 1924. He has been employed by the Nashua Manufacturing Company, the Mellon Institute at Pittsburgh as a fellow working on "Laundryowners Association" projects, and the American Institute of Laundering at Joliet, Illinois, with whom he remained until October, 1944, the last few years as manager of the Research and Textile Departments.

Since that time he has been engaged in consulting work.

• Woonsocket Philadelphia Offices

Woonsocket Color and Chemical Co. of Woonsocket, R. I., announces the opening of an office and warehouse in Philadelphia to serve the territory directly with a complete line of dyestuffs, soaps, and textile specialties.

Mitchell Stead, Jr., has been placed in charge of this office and warehouse. Mr. Stead studied chemical engineering at the Drexel Technical Institute and, following service in the United States Army during the war, was associated with his father in the dyestuff business. Mr. Stead spent two years in the research laboratories of Rohm and Haas Company and after this service was employed by the Pioneer Chemical Works as salesman in the Philadelphia area.

In his new position Mr. Stead will direct sales in New Jersey. Delaware and Maryland.

• Russian Chemical Journal Translated into English

American chemists can now refer to contemporary Russian chemical literature in complete English translation, as a result of the translation-publication program of Consultants Bureau, 153 West 33 Street, New York, N. Y. Inaugurating its program of publishing complete English translations of Russian scientific and technical journals, this agency has already published in English the January and February (1949) issues of the *Journal of General Chemistry of the U.S.S.R.* publication of the Academy of Sciences of the U.S.S.R. Subsequent 1949 issues of the Russian Journal received thus far in the United States, are now under translation, and will be published at the rate of two issues each month.

In 1950, issues of the Russian *Journal of General Chemistry* will be translated and published by Consultants Bureau within six weeks after receipt of the Russian magazine in this country. Additional scientific journals of the U.S.S.R., in the fields of applied chemistry, physical chemistry, and physics will be translated into English and published by Consultants Bureau during the coming year.

The translation of the *Journal of General Chemistry of the U.S.S.R.,* which is reproduced by the multilith process, includes all tabular material, graphs and diagrams as well as all literature references. Among the 27 reports in the first translated issue, (January, 1949) are: *Porous Structure of Catalysts and Effect Upon Catalytic Activity,* by A. V. Agafonov and M. A. Kaliko, Central Institute of Aviation Fuels and Oils; *The Reaction of Aliphatic Oxides with Hydrogen Fluoride,* Nos. I and II of a series of reports by I. L. Knunyants and Coworkers at the Institute of Organic Chemistry of the U.S.S.R. Academy of Sciences; and *Amino Derivatives of Arylphosphoric Esters,* by V. F. Kucherov, Laboratory Experimental Chemotherapy, Ministry of Medical Industry, U.S.S.R.

On a yearly subscription basis, the Consultants Bureau English translations of the *Journal of General Chemistry of the U.S.S.R.* is $95.00, for all 12 issues. Single issues may be purchased for $12.00, single articles for $5.00.

• Leather Chemists Convention

The 1950 Convention of the American Leather Chemists Association will be held at French Lick Springs Hotel, French Lick, Indiana from Wednesday, May 31st to Friday, June 2nd.

During the afternoon and evening of Tuesday, May 30th, various committee meetings will be held. A program of papers is now being arranged that should be of interest to both the scientific and practical members of the leather and allied trades industries.

• Development in Package Yarn Dyeing

A new method of package yarn dyeing in which the dye is quickly and uniformly diffused through perforated tubes into the inner convolutions of yarn, has been announced by Technical Papers Corp., 25 Huntington Avenue, Boston 16, Mass.

The company states that perforated cores such as Dytex tubes, covered or not with stockinette sleeves, fail to distribute dye evenly to the inner convolutions of packages of yarn because the solid areas between the holes in the tubes block penetration to the yarn at these points.

Skintex wrappers, paper sheets composed of highly purified vegetable fibers possessing extremely rapid capillary absorption rates as well as fast permeability, are treated so that they retain very substantial strength when immersed in hot or cold dye baths, the company states. In use, they are wrapped around the perforated tube before winding the yarn package. The surfaces of Skintex wrappers are smooth and reportedly do not snag the yarn. When the package, after dyeing, is rewound on the cop, the wrapper is said to fall free of the perforated tube. This saves the additional operation of pulling the stockinette sleeve from the tube.

The cost of the Skintex wrapper is reported at a fraction of a penny.

Skintex is the product of Technical Papers Corporation, and samples and adtional information will be furnished on request.

• Electro Announcements

The Electro Chemical Supply & Engineering Company, simultaneously with an announcement of the removal of its offices from Paoli, Pa., to its new office and plant at 750 Broad Street, Emmaus, Pa., announced two appointments and details of a new product.

Fred G. Baker has been named as Director of Engineering & Design. Mr. Baker is a chemical engineer, graduate of the Iowa State College, 1940, and until recently, a member of the Engineering Department of the E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware.

The H. D. Fowler Co., Inc., of Seattle, Washington, has been appointed as agent in the Northwest. H. D. Fowler, the head of this company, is reported to have had long experience in waterworks, industrial supplies and equipment, including acid and alkali-proof construction work, and in handling jointing materials for water pipes for many years. The materials which the H. D. Fowler Co., Inc. reportedly will handle for Electro Chemical, include Wedgetite jointing material for water pipes, Brimsto sulfur cement, Lecite resin cement, and Duro Triplex silicate cement for acid and alkali installations; also Duro-Prene and Duro-Bond synthetic rubber and natural rubber coatings and linings.

Lecite, the new thermosetting synthetic resin cement, is reported to have novel physical and chemical properties. It is said to be inert to solvents, fats, oils, greases, alkalis and acids, except strong chromic, nitric, and sulfuric over 60° Bé at temperatures to 375°F. Lecite is claimed particularly useful for jointing acid-proof brick and pipe in the construction of neutralizers, disposal units, tanks, process equipment, towers, fume ducts and stacks, floors, etc., where the above corrosions are a factor. The product, which the company states may be stored indefinitely at atmospheric temperatures, is reported non-toxic. Other claims are that it will not foam to form a porous mortar and give off toxic fumes and that it sets quickly to form a dense, shiny, shock resistant joint. Lecite is reported non-inflammable with a compression strength in excess of 10,000 pounds per square inch.

• Chemical Industries Exposition

Wet processors visiting the 22nd Exposition of Chemical Industries which was held earlier this month at Grand Central Palace, New York, were able to view numerous exhibits directly or indirectly bearing upon the field, even though chemical processing and handling equipment displays constituted a huge majority.

Though direct references and applications of chemicals to textiles were rather sparse, there was much in the way of instruments and machinery installations to hold their interest.

The mammoth show boasted over 400 exhibitors and was well attended through its entire run.

• Walsh Joins Sales Staff

J. W. Walsh, formerly with La France Industries, Inc., at Pendleton, S. C., has joined the sales staff of The Carolina Aniline & Extract Company of Charlotte, N. C.

Chester A. Gage

• Gage HQ at Chicago

Chester A. Gage, prominent in the packaging field, is rounding out 35 years in the adhesive business. Vice president in charge of sales for National Starch Products Inc. and National Adhesives Division, he is now making his headquarters at Chicago, reportedly to maintain close personal contact with the various sales offices of the company.

• New House Organ

First issue of a new house organ, "Chemonomics" has been distributed by R. S. Aries & Associates, 26 Court Street, Brooklyn, chemical engineers and economists. In the form of a four-page newspaper, "Chemonomics" takes its name from chemistry and economics and summarizes the activities of the Aries organization.

Describing in newspaper style how Aries & Associates is designed to eliminate much of the lag between technological advances and the successful marketing of products, "Chemonomics" reportedly offers a new approach to chemical journalism.

Vol. 1, No. 1, tells of new opportunities for industrialization in several Latin American countries. It contains an open letter to the editor of "Fortune" on that magazine's failure to include industry's point of view in its "Anti-Trust" publicity. It also describes Ethylene Oxide, and it offers a new thought on industrial profits.

Articles on industrial alcohol, cresylic acids, staff travels and foreign news complete the first issue of a publication which is planned to be a regular production of the Aries group.

• Diallylcyanamide Introduced

The New Products Department of the American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y., announces the introduction of trial lot quantities of Diallylcyanamide. This new material is a liquid reportedly having a boiling point of 222°C. and a freezing point below -70°C. Less than one per cent soluble in water at 28°C., Diallylcyanamide is miscible with most organic solvents and acts as a solvent for most natural and synthetic resins, the company states.

The chemical reactions of Diallylcyanamide are reported mainly based upon the reactivity of the nitrile group with compounds containing active hydrogen, such as water, amines, alcohols, and hydrogen sulfide. These and other reactions will bear further investigation.

In addition to Diallylcyanamide, the dimethyl, diethyl, and diisopropyl cyanamides are also available in experimental quantities. The company feels that all these compounds may be of interest to the paint, paper, petroleum, plastics, rubber and textile industries. A technical bulletin describing the chemical and physical properties of these compounds is available upon request from the New Product Development Department of the American Cyanamid Company.

• New Sandoz Film on Cuprofix

Sandoz Chemical Works, Inc., 61 Van Dam Street, New York 13, N. Y. announces the production of a new Kodachrome sound film entitled "Cuprofix—A Modern Aid to Improved Color Fastness". The film was previewed recently at a gathering of press representatives.

The film points out the need for better color fastness of garments exposed to water, perspiration, sun, etc. and illustrates the application and effectiveness of the Cuprofix treatment. Scenes at the Abbeville Mill of Deering-Milliken Co., Abbeville, S. C. show the application of Cuprofix in package dyeing of blended spun rayon and wool yarns and other scenes at the Holeproof Hosiery Co., Marietta, Ga. show the complete knitting and dyeing of cotton and rayon half hose with acetate decorations.

The manufacture of rayon gabardine shirting is followed from loose staple to finished cloth, after which it is shown being processed at the Clearwater Finishing Co., Old Fort, N. C. by a combined Cuprofix-resin treatment. Scenes at Norwich Knitting Co., Norwich, N. Y. illustrate the knitting of cotton yarn into fabric after which it is direct dyed and after-treated with Cuprofix. Garments made from the materials dyed during the filming of the picture are washed with white clothes in a home automatic washing machine at the Good Housekeeping Institute textile laboratory to illustrate the fastness of Suprofix-dyed materials.

Production of the 16 mm. film took four months, most of which time was spent on mill operations. It has a showing time of 21 minutes. The film is available for presentation before any group interested in the manufacture or dyeing of cotton or rayon materials.

Cuprofix is a recently developed compound which, when used as an after-treatment for selected direct dyes is intended to improve the fastness of these dyes to washing, perspiration and water. It is a greenish powder readily soluble in water. The direct color is dyed as usual, followed by rinsing and after-treatment with a percentage of Cuprofix approximately equal to the amount of dyestuff used.

A booklet on Cuprofix is available which discusses the fastness properties of Cuprofix after-treated dyeings, selection of direct colors, type of material suitable for the treatment, application in general, use in conjunction with resin finishes, dyeing of half hose, dyeing of yarn in package machines, dyeing of cotton or rayon knit gods, and dyeing of cotton raw stock, rayon waste or staple.

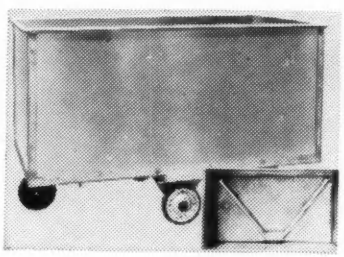
• Dyehouse Truck

A new design of dyehouse truck has been developed by KIF Industrial Fabricators, North Haven, Conn, which incorporates patented construction features which "keep workers' feet dry."

Unique drainage is said to funnel washing and dyeing liquids through a central outlet, away from workers' feet. The patented drainage reportedly prevents damage to cloth that occurs in perforated bottom trucks. There are no perforations to suck wet fabrics through and tear them. This damaging action is claimed offset by KIF's channel-protector.

Stainless steel sides have replaced conventional slatted sides which are said to prevent cloth from being frayed. The top edges of the tub are rolled for worker and cloth protection.

The company states that the truck is made in sizes to suit a variety of washing, dyeing and liquid-handling operations. Equipped with heavy duty roller bearing wheels and casters, the trucks are said to roll easily and afford rugged duty.



KIF Truck

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Bernard R. Armour

BERNARD R. ARMOUR

BERNARD R. ARMOUR, a prominent figure in the chemical and textile industries for many years, died suddenly on December 1st in Roosevelt Hospital, New York, after being under observation for one week. He was 58 years old and made his home at 251 Dana Place, Englewood, New Jersey. Funeral services were held at Park Avenue Synagogue, New York, on Sunday, December 4th.

Mr. Armour had headed American Aniline Products, Inc., since its inception in 1917. He also headed the predecessor company, the Swiss Colors Company, which he founded in 1909. He was President of the Heyden Chemical Corporation, to which was recently added Rumford Chemical Corp., and was active in a number of other corporations, including: American Potash & Chemical Corp., Chairman of the Board of Directors; Ansbacher-Siegle Corp., Director; Charles Hellmuth Printing Ink Corp., President and Director; Hartford Rayon Corp., President and Director; Markt & Hammacher Co., Director; The Ore & Chemical Corp., Treasurer and Director; Pell, Ltd., Director; United Zinc Smelting Corp., Treasurer and Director.

In the textile field Mr. Armour was head of the Aspinock Corp., which included the Lawrence Print Works, Hampton Print Works, Union Bleachery and Arnold Print Works Divisions. He also was head of the Associated Dyeing and Printing Company and Sussex Dye and Print Works.

Mr. Armour, who was a frequent visitor to the White House and a friend of President Truman, served on many committees of the Democratic State and National organizations as well as being an active participant in civic affairs of New York City. In 1947 he served as a member of Mayor O'Dwyer's fact-finding committee appointed to study the issues involved in the Railway Express strike. He served as a member of the Executive Advisory Committee of the New York City Department of Commerce which, in 1948, probed the dispute between airlines and the Port of New York Authority. During the recent election campaign he served as Chairman of the Heavy Industry and Manufacturing Division of the Independent Citizens Committee for the Reelection of Mayor O'Dwyer. Recently, he was appointed a Director of the Chamber of Commerce of the new state of Israel.

Mr. Armour was a charter member of the Chemists' Club of New York, a Director and former Vice-President of the New York Board of Trade, a member of the American Association of Textile Chemists and Colorists, and a member of the National Democratic Club.

Mr. Armour is survived by his widow, three daughters, three sisters, and a brother, George L. Armour, Executive Vice-President and Director of American Aniline Products, Inc., and a member of the boards of directors of other Armour properties.

RAYMOND C. CAFFRAY

RAYMOND E. CAFFRAY, 50, president of Shamrock Textile Processing Co., Paterson, N. J., died Friday, Nov. 25 at the Barnert Memorial Hospital in Paterson.

Mr. Caffray formed Shamrock last August and was the first licensee under the new dyeing process of Vat Craft Corp. He previously had been general manager of the Lawrence Print Works branch of Aspinook Corp. six years. Prior to that, he was 15 years general manager of the Lawrence Print Works division of Pacific Mills.

He is survived by his widow, Muriel, and two sons, Robert G. and William H.

GEORGE M. DUNNING

GEORGE M. DUNNING, 61, Director of Eastern Sales of the Michigan Alkali Division, Wyandotte Chemicals Corporation, died Nov. 16.

In 1904, Mr. Dunning joined Edward Hill's Son and Company, who were then sole agents for the Michigan Alkali Company; in 1928, he was made assistant director of sales, and on January 1, 1940, was appointed to the position of Director of Eastern Sales.

George M. Dunning

He was prominent in the alkali industry as well as a member of the Nominating and Admissions Committee of the Chemists' Club and Director of the Chemists' Club. He had charge of the distribution of chlorine for his company during the war under the WPB. His clubs were: Union League, The Chemists' Club, The Sales Executives Club of New York, and The Salesmen's Association of American Chemical Industries.

He is survived by his widow, Mrs. Frances L. Dunning, a son, George M. Dunning, Jr., and three daughters, Frances Virginia, Dorothea Dunning, and Mrs. Audrey Neuburg.

DR. SEYMOUR M. HERMANN

ON Wednesday, November 23rd, Dr. Seymour M. Hermann, of 23 West 73rd Street, New York City, succumbed to a heart ailment which had incapacitated him for some time.

Dr. Hermann, at the time of his death, was retired but prior to 1946 he had served for more than 40 years as President of the Apex Chemical Co. Inc. of New York and Elizabeth, N. J. and had been a founder of that firm.

Born in Troy, N. Y. in 1876, he had been educated at Columbia College and the University of Giessen in Germany. During his career he was responsible for many patents on leather finishing and textile improvement.

His memberships included the American Chemical Society, American Institute of Chemists, American Geographical Society, American Association for the Advancement of Science, American Arbitration Association, American Military Engineers, National and New York Post, American Leather Chemists Association, and many local and philanthropic organizations.

Surviving are his wife, and son, Stanford L. Hermann, President of the Stanetal Corporation and the American Organic Chemical Corporation of Linden, N. J.

Index to
AMERICAN DYESTUFF REPORTER
Volume 38
January, 1949-December, 1949

INDEX BY SUBJECT

FOR your convenience there appears below a list of page numbers in the respective issues for 1949. Those in the first columns indicate the numbers of the general pages and those in the second columns indicate which pages appeared in the Proceedings of the American Association of Textile Chemists and Colorists.

The presence of the letter "P" before the page number, anywhere in this index, indicates that the material appeared in the Proceedings of the Association.

Date of Issue	*No. of Issue*	*General Pages*	*Proceedings Pages*
January 10	1	33 to 52	P1 to P32
January 24	2	85 to 104	P53 to P84
February 7	3	105 to 148	P113 to P136
February 21	4	149 to 200	P157 to P184
March 7	5	201 to 252	P209 to P240
March 21	6	253 to 288	P261 to P280
April 4	7	289 to 320	P297 to P316
April 18	8	321 to 360	P329 to P352
May 2	9	361 to 396	P369 to P392
May 16	10	397 to 424	P403 to P416
May 30	11	425 to 452	P437 to P444
June 13	12	453 to 480	P461 to P468
June 27	13	481 to 512	P485 to P504
July 11	14	513 to 542	P523 to P534
July 25	15	543 to 570	P551 to P562
August 8	16	571 to 602	P587 to P590
August 22	17	603 to 634	P619 to P626
September 5	18	635 to 662	P643 to P650
September 19	19	663 to 694	P679 to P682
October 3	20	735 to 742	P695 to P734
October 17	21	743 to 772	P757 to P764
October 31	22	773 to 804	P781 to P792
November 14	23	833 to 840	P805 to P832
November 28	24	869 to 876	P841 to P868
December 12	25	877 to 908	P909 to P932
December 26	26	955 to 966H	P933 to P954

AATCC Research, Inner Workings of (Bonnar) P486
Abrasion on Breaking Strength and Elongation of Fifty-Eight Clothing Fabrics, The Effect of (Stout and Moseman) 417
Absorbency Apparatus, A Water (Jackson and Roper) 397
Absorption Tests Using Hexagonal and Cylindrical Jars, The Relationship Between Results of Dynamic (Landsberg, Sembach, and Blum) 744

ABSTRACTS
(*Listed in order of appearance*)

Textile Printing 207
Block Printing 207
The Screen Printing of Textiles 207
The Hydrosulfites Production, Properties and Textile Applications 207
A Method for the Graphical Representation of the Dyeing Properties of Acid Wool Dyes 207
The Action of Light on Cellulose Acetate Rayon and Nylon Dyed with Duranol, Dispersol, S.R.A. and Solacet Dyes ... 208
Permanent Finishes on Viscose Rayon Depending on Cross-Bonding 208
Finishing Symbols 208
Wool Dyeing Faults Can be Prevented or Cured 208
A Systematic Investigation of the Color and Dyeing Properties of the Aminoacridines. Part II—Diaminoacridines and Substituted Monoaminoacridines 259
The Application of Chrome Dyes to Nylon Textiles 259
Some Defects Arising in the Finishing of Woolen and Worsted Fabrics 260
Trends in Knit Goods Call for Better Finishing 260
Color and Constitution. Part X—Diazonium Salts 260
Color and Constitution. Part XI—The Aminocoumarins 260
Adsorption of Surface-Active Agents by Fibers 260
Dyeing Studies at Elevated Temperatures: Use of Temperatures Between 200°F. and 300°F. 260
Reaction Between Wool and Active Chlorine 324
Padding Operation Has Many Variables 324
New Developments in Army Sea Water Laundering 324
Moisture Determination in Textiles by Electrical Meters: Part I 325
Use of Cation Active Finishes 325
Retardation of Heat-Induced Strength Loss in Cotton Yarns by Liquid Ammonia Treatment 325
The Incidence of Calcium Salts in Textile Finishing 325
The Screen Printing of Textiles 325
Reworked Woolens Are Better if Stripped Before Dyeing 325
Industrial Applications of the Sodium Silicates, Some Recent Developments 549
Evaluation of Ternary Mixtures, Synthetic Detergent—Soap-Builder 549
The Combination of Wool with Acids—A Quantitative Interpretation in Terms of the Donnan Theory of Membrane Equilibrium 549
The Degradation of Cotton During Atmospheric Exposure, Particularly in Industrial Regions 550
The Application of Organosilicon Polymers to Wool 550
Preparation, Dyeing and Finishing of Fibro Fabrics 550
The Treatment of Wool with Acid Permanganate Solutions 550
Some Observations on the Levelling Properties of Acid Dyes II—Prechromed Dyes 591
The Mechanism of Diazotization and Nitrozation 591
Addition of Cellulose Glycollic Acid to Detergents 591
Annual General Meeting 591
Protective Action of Certain Vat Dyes Against the Influence of Light 592
Chemically Modified Wool 592
Protective Action of Sodium Pyrophosphate when Dyeing in the Presence of Iron 592
Dyehouse Economics 592
George Douglas, His Times and Some Thoughts on the Future 592
Progress in Bleaching Practice 592
The Raising of Dyed Fabrics 592
Dye Resists Nylon 592
Resisting of Effect Threads for Vat-Dyed Cotton Half-Hose 593
A Comparison of Common Salt vs. Glaubers Salt for Evaluating Fast-to-Light Direct Colors 593
The Thermosol Process for the Coloration of Fiber V, Orlon Acrylic Fiber and Nylon 593
Fungicide-Treated Cotton Fabric: Outdoor Exposure and Laboratory Tests 617
Effect of pH When Bleaching with Hydrogen Peroxide 617
The Spectrophotometer as an Aid in Dyeing 617
Accelerated Aging Tests to Simulate Actual Use of Fabrics 617
The Surface Dyeing of Plastics 618
Origin and Identification of Damage to Textile Fibers 618
Fire-Retardant Coatings for Fabric-Covered Aircraft 618
Rate of Dyeing as an Aid to the Classification of Direct Dyes on Viscose Rayon 618
An Improved Multipurpose Abrasion Tester and Its Application for the Evaluation of the Wear Resistance of Textiles 618
The Effect of Variations in Degree of Structural Order on Some Physical Properties of Cellulose and Cellulose Acetate Yarns 641
A Study of the Bleaching of Blue Cotton Fiber 641
Report of the Committee on the Fastness of Dyes on Leather 642
Worsteds for Hard Wear Need Special Attention in Dyeing 642
Evaluation of Desizing Aids In Preparation for Dyeing 642
The Fungi Concerned in Fiber Deterioration: II—Their Ability to Decompose Cellulose 642
Specificity of Microbiological Attack on Cellulose Derivatives 642
Wool Damage Data 642
Shrinkage Control of Wool by Melamine Resins: Part I—Microscopical Observations 642
Shrinkage Control of Wool by Melamine Resins: Part II—Torsional Rigidity and Elastic Properties of Single Fibers 642
Detergency Studies: IV—Influence of Oily Soil Upon the Removal of Pigment Soil 658
Wool and Fur Hat Dyeing 658
The Spectrophotometer as an Aid to Dyeing 779
Short Aging Processes for the Printing of Synthetics, Silk and Wool 779
Spectrophotometry 779
Machine Printing of Textile Fabrics 779
The Cross-Linking of Animal Fibers I-3:4-*iso*-Propylidene 1:2-5:6 Dianhydromannitol 780
Correlation of Simulated Rainfall Tests with Laboratory Penetration Tests 780
New Principles in the Continuous Dyeing of Wool 780
Roller Printing Troubles 803
Crease-Resistant Finishes with Urea-Formaldehyde Resins 803
Application of Vat Dyes by Pad and Continuous Unit Methods 803

The Autoxidation of Alkali Cellulose I—An Experimental Study of the Kinetics of the Reaction 803
The Formation of Polymers in Wool 803
The Dyeing of Leather 804
Pore-Size Distribution in Textiles 804
Urea as a Solvent Aid for Cellulose Textile Sizes 804
Factors Affecting pH Control 804
Abstracts of Intersectional Contest Papers P721
Abstracts of Papers to be Presented at Meetings of the Division of Cellulose Chemistry of the American Chemical Society 675
Abstracts of Technical Papers P718
Acetate and Viscose Fabrics with Vat Colors, Dyeing Mixed (Piedmont Section) P816
Acetate Rayon, The Action of Light on Cellulose, and Nylon Dyed with Duranol, Dispersol, S.R.A. and Solacet Dyes (Egerton) 608
Acid Colloids of Resins (Rhode Island Section) P842
Acrylic Fiber and its Use in Colored Textiles, The Dyeing of "Orlon" (Thomas and Meunier) P925
Action, Freedom in (Sayre) P863
Address of the Medalist (Chase) P302
Address of the Medalist (Seibert) P916
Address, The President's (Herrmann) P951
Agents, Effect of Various Surface-Active, on the Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions (Scanlan, Stirton, Swern and Roe) 455
Agents, Evaluation of Dispersing P947
Agents, The Solubilization of Dyestuffs with Surface Active (Mid-West Section) P728
Ager, A Fundamental Study of Aging Conditions in the Vat (Fahnoe) 663
Aging Conditions in the Vat Ager, A Fundamental Study of (Fahnoe) 663
Aging Processes, Short, for the Printing of Synthetics, Silk, and Wool (Saville) P310
Aging Textile Prints and Their Control, Problems in (Choquette and Habel) P919
Alphabetical List of New Products 877
American Chemical Society, Abstracts of Papers to be Presented at Meetings of the Division of Cellulose Chemistry of the 675
Amino and Imino Groups in Textile Materials, Reaction for (Wallin) 746
Analytical Methods for a Textile Laboratory P622, P682
Annual Business Meeting P943
Application of Fast Colors to Mercerized Cotton Hosiery, The (Asbury) P58
Application of Vat Colors, Some Conditions Affecting the (Rhode Island Section) P69
Aqueous Solutions, An Index of the Water-Repellency of Textiles From the Surface Tension of (Schuyten, Weaver and Reid) 364
Armed Services Exhibit P910
Army and Navy to Exhibit at Convention P680
Atlantic City Convention P332, P438, P650
Atlantic City Convention, Chairman and Vice-Chairman for P589
Atlantic City Convention, Exhibits at P439
Atlantic City Convention Notes P553
Augusta, Georgia, Broadcast From Station WBBQ P56
Award Approved by Council, Annual Prize Paper P534
Award to Joan L. Gregg, NNE P821

Banquet, Morris Sayre to Speak at Convention P680
Beetle Larvae, Available: Controlled Carpet (Anderson) 636
Bleaching, Fluorescent (Landolt) 353
Bleaching Goods for Dyeing and Finishing in the Continuous Open-Width Peroxide System (Moore) P497
Bleaching of Linen Piece Goods (Kiviranta) 546
Bleaching Powder Solutions, Effect of Various Surface-Active Agents on the Penetrating Power and Stability of Calcium Hypochlorite and (Scanlon, Stirton, Swern and Roe) 455
Blend, A Quality, Makes Successful Sales (Price) P234
Blends, The Dyeing of Wool-Nylon (Hug) 661
Block Printing (Chadwick) 833
Bonded Fabric Industry, The (Seymour) 453
BOOK REVIEWS
(*Listed in order of appearance*)
Source Book of Personnel Forms 281
Physical Aspects of Colour 281
Handbook of Chemistry and Physics 281
The Identification of Textile Materials 282
1948 ASTM Standards on Textile Materials 282
High-Polymer Physics 282
Papers Delivered at the First Canadian Textile Seminar 282
The Chemical Technology of Dyeing and Printing Vat, Sulfur, Indigosol, Azo and Chrome Dyestuffs and Their Auxiliaries 282
Technique of Organic Chemistry, Volume II 283
Elsevier's Encyclopedia of Organic Chemistry 283
Neuste Fortschritte und Verfahren in der chemischen Technologie der Textile fasern. Zwerter Teil 283
114 Check Points on How to Prevent Grievances 452
Formula for Supervision 452
Handbook of Chemistry and Physics, 31st Edition 475
Colloid Chemistry, 2nd Edition, 1949 475
Surface Active Agents 511
The Story of Silk 511
Absorption Spectrophotometry 511
Elsevier's Encyclopedia of Organic Chemistry 570
Fundamental Processes of Dye Chemistry 570
Edmund Potter and Dinting Vale 660
Dyeing with Fast-AVIK-Dyes 876

BRADFORD DURFEE TECHNICAL INSTITUTE STUDENT CHAPTER
Reports P77, P114, P334, P485, P918
Breaking Strength and Elongation of Fifty-Eight Clothing Fabrics, The Effect of Abrasion on (Stout and Moseman) 417
Broadcast From Station WBBQ, Augusta, Georgia P56
Business Meeting, Annual P943

CALENDAR P5, P55, P114, P158, P212, P267, P297, P331, P369, P404, P441, P468, P485, P524, P556, P590, P521, P649, P682, P732, P763, P792, P805, P852, P909, P950
Camp, Retirement of Professor P404
Carpet Beetle Larvae, Available: Controlled (Anderson) 636
Carroll on Entertainment Program for National Convention, Jean P682
Cellulose Acetate Rayon, The Action of Light on, and Nylon Dyed with Duranol, Dispersol, S.R.A. and Solacet Dyes (Egerton) 608
Cellulose Chemistry, Division of, of the American Chemical Society, Abstracts of Papers to be Presented at Meetings of the 675
Chairman and Vice-Chairman for Atlantic City Convention P589
Chairman, Greetings from the Convention P697
Changes, Dimensional, Occurring in Spun Viscose Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing (Philadelphia Section) P822
Changes in Research Committee Personnel P946
Characteristics and Dyeing Methods, Practical Tests for Quantitatively Evaluating Dye (Northern New England Section) P812
Chase, Harold M., The Man (Carroll) P299
Chase, Harold M., The Scientist (Wood) P301
Chemical Control of Wool Shrinkage, Some Aspects of the (Gould) P407
Chemical Specialties, Textile P2
Chemist, Headaches of a Dyestuff (Grimmel) P466
Chemistry of Commercial Plastics, The (Wakeman) P856
Chlorination Processes, Shrinkage Control of Wool (Epelberg) P526
Chlorine in Textiles, The Spectrographic Determination of (Johnson and Norman) 361
Chlorine Pickup, Determination of (Atkinson and Sargent) 743
Citation P302, P916
Classification, Report of Committee for Nomenclature and P489

CLEMSON COLLEGE STUDENT CHAPTER
Reports P462, P922, P944
Cloth, Comparative Efficiencies of Wetting Agents on Woolen (La Fleur) 367
Clothing Fabrics, The Effect of Abrasion on Breaking Strength and Elongation of Fifty-Eight (Stout and Moseman) 417
Colloids of Resins, Acid (Rhode Island Section) P842
Color and Spectrophotometry, The Elements of (Rhael) P490
Colored Materials to Radiant Energy, A Proposal for Specifying the Stability of (Lowry) 543
Colored Textiles, The Dyeing of "Orlon" Acrylic Fiber and its Use in (Thomas and Meunier) P925
Colorings Obtainable with Naphthol and Vat Dyestuffs, Fast (Nuttall) P923

COLORIST AND CONVERTER SECTION, TEXTILE
Converting Markets 34, 86, 137, 193, 241
New Services, Projects, Businesses 44, 97, 144, 198, 246
Personnel 46, 98, 146 200, 248
These Are New 48, 100, 148
New Linear Polymer Research 35
The Significance of the Growing Synthetic Textile Industry (Huffines) 36
Eugene Messner Predicts 38
Textile Apparel Industry, Quatermaster Corps Get Together 40
Shine Eliminated from Textiles 42
Fifty Years of Daytime Fashions 43
Fabric Serviceability—the Key to Better Business (Dorn) 87
The Converter Speaks Her Mind (Skillman) 89
The Rayon Outlook (Stevens) 90
Remote Control of Dyeing Cycles (Wallace) 92
The Converter Speaks His Mind (Oppenheimer) 94
New Minimum Standards of Quality for Sheets, Pillowcases 95
Czechoslovak Industries Fair 96
Fall Woolen Colors 96
The Cotton Outlook (Heller) 138
Textile Research Achievements in 1948 (Goldberg) 140
Cotton in the Converting Industry 194
Causes of Damage to Textile Fibers (Kornreich) 196
The Wool Outlook (Foreman) 197
"Lantuck"—New Bonded Fabric 242
Serious Wool Shortage, Council Holds 243
Modern Rayon Research and Development 244
Disposable Cover Now Printed for Positive Identification of Avisco Rayon Cakes 245
Colors and Dyeing, Hosiery (Crumley) P443
Colors, Dyeing Mixed Acetate and Viscose Fabrics with Vat (Piedmont Section) P816
Colors, Stability of Vat, at Elevated Temperatures (Piedmont Section) P213
Committee, A Report by the Convention P701
Committee Chairman Named for 1950 Convention P805
Committee for National Convention P210
Committee for Nomenclature and Classification, Report of P489
Committee Personnel, Changes in Research P946
Committees Active on Convention Planning P620
Committees, Local Convention P703
Committees, Of Interest to Members of Research P952
Complaints, Consumer, From New Fabrics and Finishes (Johnston) P65
Compounds, Nonionic, Their Employment in the Textile Industry (Sisley) 513
Conditions Affecting the Application of Vat Colors, Some (Rhode Island Section) P69
Conditions of Temperature and Humidity in the Fade-Ometer, The (Nordhammar) 571
Consumer Complaints From New Fabrics and Finishes (Johnston) P65
Consumer Textiles, Flammability of (Buck) P78
Contest Committees, Intersectional P706
Contest Committee, Mid-West Section, Intersectional P589
Contest Committee, National Intersectional P298
Contest Committee, Northern New England Section, Intersectional P680
Contest Committee, Philadelphia Section, Intersectional P621
Contest Committee, Piedmont Section, Intersectional P590
Contest Committee, Rhode Island Section, Intersectional P621
Contest Committee, South Central Section, Intersectional P525
Contest Committee, Southeastern Section, Intersectional P525
Contest Papers, Abstracts of Intersectional P721
Continuous Open-Width Peroxide System, Bleaching Goods for Dyeing and Finishing in the (Moore) P497

Control, Problems in Aging Textile Prints and Their (Choquette and Habel) P919
Convention, Atlantic City P332, P438
Convention, Chairman and Vice-Chairman for Atlantic City P589
Convention, Exhibits at Atlantic City P439, P488

CONVENTION, NATIONAL (ATLANTIC CITY)

Committee Formed P210
National Intersectional Contest Committee P298
Atlantic City Convention (Technical Program) P332, P438
Exhibits P439, P488, P711, P806
1949 Convention Notes P463, P488, P553
Intersectional Contest Committees—(also pg. P706)
South Central Section P525
Southeastern Section P525
Mid-West Section P589
Piedmont Section P590
Rhode Island Section P621
Philadelphia Section P621
Northern New England Section P680
Chairman and Vice Chairman P589
Committees Active on Planning P620
Preliminary Program P645
Morris Sayre to Speak at Banquet P680
Army and Navy to Exhibit P680
Jean Carroll on Entertainment Program P682
Greetings from Your President P695
Program P696
Greetings from the Chairman, Philadelphia Section P697
Greetings from the Chairman P697
Theme P699
Executive Committee on Research P700
Committee Report P701
Olney Medal to be Awarded to Charles A. Seibert P702
Local Committees P703
The Philadelphia Section P708
Abstracts of Technical Papers P718
Abstracts of Intersectional Contest Papers P721
The Wet Processing Industry in the Philadelphia Area P725
28th National Convention P782
Intersectional Contest—
Factors Influencing Crockfastness of Package-Dyed Naphthol Cotton Yarns (South Central Section) P786
Practical Tests for Quantitatively Evaluating Dye Characteristics and Dyeing Methods (Northern New England Section) P812
Dyeing Mixed Acetate and Viscose Fabrics with Vat Colors (Piedmont Section) P816
Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing (Philadelphia Section) P822
Acid Colloids of Resins (New York Section) P842
Auxiliaries and Testing Group Meeting—
Static in Textile Processing (D. J. Lehmicke) P853
Cellulosic Fibers Group Meeting—
Vat Dyeing: Importance of Initial Exhaustion Rate (Clark and McCleary) P828
Problems in Aging Textile Prints and Their Control (Choquette and Habel) P919
Annual Banquet Session—
Freedom in Action (Sayre) P863
The President's Address (Herrmann) P951
Armed Services Exhibit P910
Olney Medal Presentation P913
Noncellulosic Fibers Group Meeting—
The Dyeing of "Orlon" Acrylic Fiber and its Use in Colored Textiles (Thomas and Meunier) P925
General Technical Session—
Recent Results of Textile Research Institute and Textile Foundation Research (Dillon) P934
Textile Education and Research (Haywood) P949

CONVENTION, NATIONAL (AUGUSTA)

Intersectional Contest—
Some Phases of High Temperature Dyeing (Philadelphia Section) P9
Some Conditions Affecting the Application of Vat Colors (Rhode Island Section) P69
Preliminary Study of Variables in Padding (New York Section) P159
Stability of Vat Colors at Elevated Temperatures (Piedmont Section) P213
The Solubilization of Dyestuffs with Surface Active Agents (Mid-West Section) P728
Annual Banquet Session—
Eleven Times Ninety Six Cents is Better Than Ten Times a Dollar (Hugh M. Comer) ..... P 9
Olney Medal Presentation P299
Harold M. Chase, The Man (Carroll) P299
Harold M. Chase, The Scientist (Wood) P301
Address of the Medalist (Chase) P302
Citation P302
Broadcast from Station WBBA, Augusta, Georgia P56
Hosiery Group Meeting—
The Application of Fast Colors to Mercerized Cotton Hosiery (Asbury) P58
Treating and Handling of Nylon Hosiery to Prevent Snagging During Manufacture (Olson) P60
Laboratory Evaluation of Sizing Materials for Nylon Hosiery Yarns (Goldstein) P372
Non-Cellulosic Fibers Group Meeting—
Latest Developments in the Dyeing and Finishing of Synthetic Fibers (Helmus) P62
Consumer Complaints from New Fabrics and Finishes (Johnston) P65
Low Temperature Properties of Textile Materials (Kaswell) P127
Applications of Leucoesters of Vat Dyestuffs to Wool (Luttringhaus) P172
General Technical Meeting—
Cotton Symposium—
Modern Trends in Piece Goods Preparation, Dyeing and Finishing (Rabold) P67
General Technical Meeting—
Recent Research on Cotton Properties at the Southern Regional Research Laboratory (Ward) P122
Testing and Auxiliaries Group Meeting—
The Effect of Temperatures on Finishing Compounds (Noble) P115
Some Interesting Applications of pH and Spectrophotometric Control in Textile and Dye Operations (Haller and Odeen) P411

CONVENTION, NATIONAL (PORTSMOUTH)

Committee Chairman Named P805
Convention Notes, 1949 ..... P463, P488, P553
Corporate Members, Reports to (Little and Bonnar) P945
Correction, Philadelphia Section Report P865
Correction P462
Corresopndence on Flammability Standards P114
Correspondence on Monograph No. 1 ..... P648
Cotton Properties, Recent Research on, at the Southern Regional Research Laboratory (Ward) P122
Cotton, Survey of, in the Non-Woven Fabrics Industry 582
Cotton Textiles, Deterioration of, Exposed to the Weather (Bogaty) 253
Cotton Yarns, Factors Influencing Crockfastness of Package-Dyed Naphthol (South Central Section) P786
Council, Annual Prize Paper Award Announced by P534

COUNCIL MEETINGS

One Hundred and Sixty-Fifth P262
One Hundred and Sixty-Sixth P405
One Hundred and Sixty-Seventh P558
One Hundred and Sixty-Eighth P762
One Hundred and Sixty-Ninth P866
Corrosion Problems in the Textile Industry, Solving (Seymour and Worth) 735
Corrosion Survey, Stainless Steel Equipment P947
Crockfastness of Package-Dyed Naphthol Cotton Yarns, Factors Influencing (South Central Section) P786
Cross-Bonding, Permanent Finishes on Viscose Rayon Depending on (Cameron and Morton) 575
Current Developments in Dyeing And Finishing (Thompson) P6
Curtains and Draperies, Fabrics for Glass (Fletcher) 603
Detergency, Data on a Laboratory Method for Wool Raw Stock (Leonard and Beck) P348
Detergent, Low Temperature Wool Piece Goods Scouring with a Synthetic Organic (Morgan and Walter) P374
Deterioration of Cotton Textiles Exposed to the Weather (Bogaty) 253
Determination of Chlorine in Textiles, The Spectrographic (Johnson and Norman) 361
Developments, Current, In Dyeing And Finishing (Thompson) P6
Developments in the Dyeing and Finishing of Synthetic Fibers, Latest (Helmus) P62
Dimensional Changes of Knit Goods in Laundering (Fletcher, Duensing and Gilliam) 481
Direct Dye Selection (Woodruff) P624
Discoverer of Hydrosulfite NF, Who Was the (Haller) 105
Dispersing Agents, Evaluation of P947
Dispersol, S.R.A., and Solacet Dyes, The Action of Light on Cellulose Acetate Rayon and Nylon dyed with Duranol (Egerton) 608
Division of Cellulose Chemistry of the American Chemical Society, Abstracts of Papers to be Presented at Meetings of the 675
Dollar, Eleven Times Ninety-Six Cents is Better Than Ten Times a (Comer) P3
Draperies, Fabrics for Glass Curtains and (Fletcher) 603
Duranol, Dispersol, S.R.A., and Solacet Dyes, The Action of Light on Cellulose Acetate Rayon and Nylon Dyed with (Egerton) 608
Dye Characteristics and Dyeing Methods, Practical Tests for Quantitatively Evaluating (Northern New England Section) P812
Dye Operations, Some Interesting Applications of pH and Spectrophotometric Control in Textile and (Haller and Odeen) P411
Dye Selection, Direct (Woodruff) P624
Dyed Naphthol Cotton Yarns, Factors Influencing Crockfastness of Package (South Central Section) P786
Dyeing and Finishing, Bleaching Goods for, in The Continuous Open-Width Peroxide System (Moore) P497
Dyeing and Finishing, Changing Aspects in (Thompson) P276
Dyeing and Finishing, Current Developments in (Thompson) P6
Dyeing and Finishing, Modern Trends in Piece-Goods Preparation (Rabold) P67
Dyeing and Finishing of Synthetic Fibers, Latest Developments In (Helmus) P62
Dyeing and Printing, Naphthol (Nuttall) P232
Dyeing, Effect of Metals on Tippy (Wool) Dyeing (Millson) P378
Dyeing, Hosiery Colors and (Crumley) P443
Dyeing: Importance of Initial Exhaustion Rate, Vat (Clark and McCleary) P828
Dyeing, Jig, and the Value of Housings (New York Section) P442
Dyeing Methods, Practical Tests for Quantitatively Evaluating Dye Characteristics and (Northern New England Section) P812
Dyeing Mixed Acetate and Viscose Fabrics with Vat Colors (Piedmont Section) P816
Dyeing of Broad-Woven Nylon Fabrics, The (Turnbull) 747
Dyeing of "Orlon" Acrylic Fiber and its Use in Colored Textiles, The (Thomas and Meunier) P925
Dyeing of Wool-Nylon Blends, The (Hug) 661
Dyeing, Some Phases of High Temperature (Philadelphia Section) P9
Dyeing, The Scientific Approach to the Study of (Vickerstaff) P305
Dyes, The Action of Light on Cellulose Acetate Rayon and Nylon Dyed with Duranol, Dispersol, S.R.A. and Solacet (Egerton) 608
Dyestuff Chemist, Headaches of a (Grimmel) P466
Dyestuffs, Fast Colorings Obtainable with Naphthol and Vat (Nuttall) P923
Dyestuffs with Surface Active Agents, The Solubilization of (Mid-West Section) P728
Education and Research, Textile (Hayward P949

Effect of Temperatures on Finishing Compounds, The (Noble) P115
Election Tellers, Report of P909
Element "X" in Nylon, The (Staudt) P339
Elements of Color and Spectrophotometry, The (Rhael) P490
Eleven Times Ninety-Six Cents is Better Than Ten Times a Dollar (Comer) P3
Elongation of Fifty-Eight Clothing Fabrics, The Effect of Abrasion on Breaking Strength and (Stout and Moseman) 417
EMPLOYMENT REGISTER P2, P55, P114, P158, P240, P267, P298, P352, P392, P406, P441, P468, P485, P524, P556, P590, P622, P648, P682, P733, P764, P791, P805, P867, P918, P948
Emulsions, Pigmented, for Textile Printing (Young) P135
Energy, Radiant, A Proposal for Specifying the Stability of Colored Materials to (Lowry) 543
Entertainment Program for National Convention, Jean Carroll on P682
Equipment and Supplies Exposition, Textile Wet Processing 425
Equipment Corrosion Survey, Stainless Steel P947
Evaluating Dye Characteristics and Dyeing Methods, Practical Tests for Quantitatively (Northern New England Section) P812
Evaluation of Dispersing Agents P947
Exhaustion Rate, Vat Dyeing: Importance of Initial (Clark and McCleary) P828
Exhibit, Armed Services P910
Exhibition, The 39th Knitting Arts 321
Exhibits at Atlantic City Convention P439, P488, P711, P806
Exposition, Textile Wet Processing Equipment and Supplies 425
Fabric Industry, The Bonded (Seymour) 453
Fabric Mildew-Resistance Tests with Organisms Tolerant Toward Copper and Mercury (Marsh) 436
Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing, Dimensional Changes Occurring in Spun Viscose Rayon (Philadelphia Section) P822
Fabrics for Glass Curtains and Draperies (Fletcher) 603
Fabrics, Non-Woven, Survey of Cotton in the Industry 582
Fabrics, Some Defects Arising in the Finishing of Woolen and Worsted (Whewell) 637
Fabrics, The Dyeing of Broad-Woven Nylon (Turnbull) 747
Fabrics, The Finishing of Nylon (Smith) 614
Fabrics, The Resin Finishing of Textile (Thomas) P413
Fabrics with Vat Colors, Dyeing Mixed Acetate and Viscose (Piedmont Section) P816
Factors Influencing Crockfastness of Package-Dyed Naphthol Cotton Yarns (South Central Section) P786
Fade-Ometer, The Conditions of Temperature and Humidity in the (Nordhammar) 571
Fast Colorings Obtainable with Naphthol and Vat Dyestuffs (Nuttall) P923
Fast Colors, The Application of, to Mercerized Cotton Hosiery (Asbury) P58
Fiber, The Dyeing of "Orlon" Acrylic, and its Use in Colored Textiles (Thomas and Meunier) P925
Fiber, Vicara—New, Derived From Zein (ter Horst) P335
Fibers, New Synthetic (Hoff) 459
Finishes, Permanent, on Viscose Rayon Depending on Cross-Bonding (Cameron and Morton) 575
Finishes, The Function of a Laboratory in the Evaluation of Textile (Cook) P313
Finishing, Bleaching Goods for Dyeing and, in the Continuous Open-Width Peroxide System (Moore) P497
Finishing, Changing Aspects in Dyeing and (Thompson) P276
Finishing Compounds, The Effect of Temperatures on (Noble) P115
Finishing, Current Developments in Dyeing and (Thompson) P6
Finishing, Current Trends in Operating Rubber Covered Rolls in Textile (Fisk) P646
Finishing, Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization (Philadelphia Section) P822
Finishing, Modern Trends in Piece-Goods Preparation, Dyeing and (Rabold) P67
Finishing of Nylon Fabrics, The (Smith) 614
Finishing of Nylon Knit Goods, Controlled (Nisbet) 773
Finishing of Woolen and Worsted Fabrics, Some Defects Arising in the (Whewell) 637
Finishing, The Resin, of Textile Fabrics (Thomas) P413
Fire-Resistant Textiles, Testing Apparatus for the Evaluation of (Rowley and Sonnino) 201
Flammability of Consumer Textiles (Buck) P78
Flammability Standards, Correspondence on P114
Fluorescent Bleaching (Landolt) 353
Foundation Research, Recent Results of Textile Research Institute and Textile (Dillon) P934
Freedom in Action (Sayre) P863

GEORGIA INSTITUTE OF TECHNOLOGY STUDENT CHAPTER
Reports P789
Glass Curtains and Draperies, Fabrics for (Fletcher) 603
Greetings from the Chairman, Philadelphia Section P697
Greetings from the Convention Chairman P697
Greetings from Your President P695
Gregg, NNE Award to John L P821
Groups in Textile Materials, Reaction for Amino and Imino (Wallin) 746
Hadley, Walter E., Elected Honorary Member P333
Harold M. Chase, The Man (Carroll) P299
Harold M. Chase, The Scientist (Wood) P301
Headaches of a Dyestuff Chemist (Grimmel) P466
High Temperature Dyeing, Some Phases of (Philadelphia Section) P9
Honorary Member, Walter E. Hadley Elected P333
Hosiery Colors and Dyeing (Crumley) P443
Hosiery, The Application of Fast Colors to Mercerized Cotton (Asbury) P58
Hosiery, Treating and Handling of Nylon, to Prevent Snagging During Manufacture (Olson) P60
Hosiery Yarns, Laboratory Evaluation of Sizing Materials for Nylon (Goldstein) P372
Host, The Philadelphia Section, Your Convention (Siebert) P708
Housings, Jig Dyeing and the Value of (New York Section) P442

HUDSON-MOHAWK SECTION
Reports P55, P267, P438, P462, P562, P865, P911
Humidity in the Fade-Ometer, The Conditions of Temperature and (Nordhammar) 571
Hydrosulfite NF, Who Was the Discoverer of (Haller) 105
Hydrosulfites, The Production, Properties and Textile Applications (Brearly and Starkie) 775
Imino Groups in Textile Materials, Reaction for Amino and (Wallin) 746
Index of the Water-Repellency of Textiles from the Surface Tension of Aqueous Solutions, An (Schuyten, Weaver, and Reid) 364
Index to Patent Digest 585
Index to Volume 38 966A
Industry in the Philadelphia Area, The Wet Processing P725
Initial Exhaustion Rate, Vat Dyeing; Importance of (Clark and McCleary) P828
In Memoriam 156D
Institute and Textile Foundation Research, Recent Results of Textile Research (Dillon) P934
Intersectional Contest Papers, Abstracts of P721
Jars, The Relationship Between Results of Dynamic Absorption Tests Using Hexagonal and Cylindrical (Landsberg, Sembach and Blum) 744
Jean Carroll on Entertainment Program for National Convention P682
Jig Dyeing and the Value of Housings (New York Section) P442
Knit Goods, Controlled Finishing of Nylon (Nisbet) 773
Knit Goods in Laundering, Dimensional Changes of (Fletcher, Duensing and Gilliam) 481
Knitting Arts Exhibition, The 39th 321
Laboratory, Analytical Methods for a Textile P622
Laboratory Method, Data on a, for Wool Raw Stock Detergency (Leonard and Beck) P348
Laboratory, The Function of a, in the Evaluation of Textile Finishes (Cook) P313
Larvae, Available: Controlled Carpet Beetle (Anderson) 636
Latest Developments in the Dyeing and Finishing of Synthetic Fibers (Helmus) P62
Laundering, Dimensional Changes of Knit Goods in (Fletcher, Duensing and Gilliam) 481
Leucoesters of Vat Dyestuffs to Wool, Application of (Luttringhaus) P172
Leveling Agents, Evaluation of (Gunther) P236
Light on Textile Materials, The Action of (Appleby) 149
Light, The Action of, on Cellulose Acetate Rayon and Nylon Dyed with Duranol, Dispersol, S.R.A., and Solacet Dyes (Egerton) 608
Linen Piece Goods, Bleaching of (Kiviranta) 546
List of New Products, Alphabetical 877
Local Convention Committees P703
Louis Atwell Olney 156A

LOWELL TEXTILE INSTITUTE STUDENT CHAPTER
Reports P114, P267, P334, P440, P496, P821
Machinery Used in Shrinkage Stabilization Finishing, Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During Processing on (Philadelphia Section) P822
Materials, Low Temperature Properties of Textile (Kaswell) P127
Materials, The Action of Light on Textile (Appleby) 149
Members of Research Committees, Of Interest to P952
Members, Reports to Corporate (Little and Bonnar) P945

MEMBERSHIP APPLICATIONS P136, P158, P231, P266, P332, P462, P534, P553, P733, P763, P790
Membership on April 1, 1949 P439
Mercerized Cotton Hosiery, The Application of Fast Colors To (Asbury) P58
Metals on Tippy Dyeing, Effect of (Millson) P378
Methods for a Textile Laboratory, Analytical P622, P682
Methods, Practical Tests for Quantitatively Evaluating Dye Characteristics and Dyeing (Northern New England Section) P812

MID-WEST SECTION
Reports P157, P334, P371, P440, P462, P554 P623, P680, P785
Mildew-Resistance Tests, Fabric, with Organisms Tolerant Toward Copper and Mercury (Marsh) 436
Moisture in Wool, An Investigation of Methods of Testing for (LeCompte and Lipp) 484
Monograph No. 1, Correspondence on P648
Morris Sayre to Speak at Convention Banquet P680
Naphthol and Vat Dyestuffs, Fast Colorings Obtainable with (Nuttall) P923
Naphthol Cotton Yarns, Factors Influencing Crockfastness of Package-Dyed (South Central Section) P786
Naphthol Dyeing and Printing (Nuttall) P232
National Convention, Committee for P210
Navy to Exhibit at Convention, Army and P680

NEW BEDFORD TEXTILE INSTITUTE STUDENT CHAPTER
Reports P525
New Fabrics and Finishes, Consumer Complaints From (Johnston) P65
"New Look" in Textiles, The (Jacoby) P529

NEW YORK SECTION
Reports P157, P297, P392, P440, P525, P552, P622, P649, P758, P764, P932, P946
Nomenclature and Classification, Report of Committee for P489
Nominating Committee, Report of P644
Nonionic Compounds, Their Employment in the Textile Industry (Sisley) 513
Nonwoven Fabrics Industry, Survey of Cotton in the 582

NORTH CAROLINA STATE COLLEGE STUDENT CHAPTER
Reports P2, P231, P406, P440, P785, P924

NORTHERN NEW ENGLAND SECTION
Reports P210, P334, P371, P440, P496, P554, P589, P648, P763, P821, P827, P932
Notice to Authors of Papers P410
Nylon Blends, The Dyeing of Wool-(Hug) 661
Nylon Fabrics, The Dyeing of Broad-Woven (Turnbull) 747
Nylon Fabrics, The Finishing of (Smith) 614
Nylon Hosiery, Treating and Handling of, to Prevent Snagging During Manufacture (Olson) P60
Nylon Hosiery Yarns, Laboratory Evaluation of Sizing Materials for (Goldstein) P372

Nylon Knit Goods, Controlled Finishing of (Nisbet) 773
Nylon Piece Goods, The Printing of (Saville) 673
Nylon, The Action of Light on Cellulose Acetate Rayon and, Dyed with Duranol, Dispersol, S.R.A., and Solacet Dyes (Egerton) 608
Nylon, The Element "X" in (Staudt) P339
Old Reporters Wanted P621, P648
Olney, Louis Atwell 156A
Olney, Louis Atwell, Resolution On P331
Olney Medal Presentation P299, P913
Olney Medal to be Awarded to Charles A. Seibert P702
Organic Detergent, Low Temperature Wool Piece Goods Scouring with a Synthetic (Morgan and Walter) P374
Organisms Tolerant Toward Copper and Mercury, Fabric Mildew-Resistance Tests with (Marsh) 436
"Orlon" Acrylic Fiber and Its Use in Colored Textiles, The Dyeing of (Thomas and Meunier) P925

PACIFIC COAST SECTION

Reports P439, P485, P487, P764, P865, P922
Package-Dyed Naphthol Cotton Yarns, Factors Influencing Crockfastness of (South Central Section) P786
Padding, Preliminary Study of Variables in (New York Section) P159
Papers, Abstracts of Intersectional Contest P721
Papers, Abstracts of Technical P718

PATENT DIGEST (Wengraf)

(Listed in order of appearance)
See also "Index to Patent Digest" P585

Slipproofing Textiles—Colloidal Silica Solution 107
Static Electricity Prevention—Covering Fabrics with a Conductive Sheet 107
Drying Fabrics and Yarns, Based on a Freezing Operation 107
Dyeing Cellulose Acetate—Saponification Mixture 108
Printing Indigosol O4B—Naphtholsulfonates Added 108
Dyeing Apparatus—Fixing Colors by Alternating Pressure and Suction 108
Modification of Cellulose Structures—Copper-alkylolamine Treatment 109
Water Repellent Fabrics—Esters of Oxyaromatic Compounds 109
Dyeing Wool—Direct Dyestuffs 110
Dyeing—Non Substantive Solutions of Dyestuffs, Dispersed in Cellulose Ethers 110
Dyeing Wool—Indigo and Indigoid Vat Dyestuffs in Ammoniacal Vats 110
Dyeing Wool—Indigo and Indigoid Vat Dyestuffs, Pigment Padded and Reduced in Acid Baths 111
Discharge Prints on Copper-aftertreated Direct Dyeings 111
Shrinkproofing Wool—Butadiene Polymers or Copolymers Used 204
Rotproofing Textiles—Metal Salts of Cellulose Glycollic Acid 205
Cellulose Solutions—Oxidation with Nitrogen Dioxide and Solution in Alkalies 205
Glass Fibers—Printing with Water-in-Oil Emulsions 205
Printing Vat Dyestuffs—Stabilized by Quinonylamides of Dicarboxylic Acids and Urea 206
Printing Lustrous Patterns on Dull Ground 206
Printing Vat Dyestuffs—Ferric Salts, Reduced by Actinic Light 206
Dyeing Apparatus for Package Dyeing 295
Pigment Printing—Combined with Reductive Discharge 295
Sizing—Starch Mixed with Etherifying or Esterifying Agents 295
Chrome Dyestuffs Printing—Paste Containing Neutral Chromates, Accelerator and Anthraquinone 296
Chrome Dyestuffs Printing—Salts of Di- or Trivalent Metals Added 296
Permanent Finishes—Cellulose Etherified with Unsaturated Chains 296
Water Repellent Fabrics—Zirconium Salts and Cetylacetamide, Dispersed in Water 325
Pigment Printing —Rubber or Vulcanized Oils, Dispersed in Resin Solutions 325
Shrinkproofing Wool-Hypochlorite, Applied Under Special Conditions 326
Creaseproofing Textiles—Ethers of Methylolmelamines 326
Creaseproofing Textiles—Urea-Formaldehyde Condensed Under Specific Conditions 363
Dyeing Nylon—Direct Dyeings on Resin Impregnated Fibers 363
Dyeing Nylon—Sparingly Soluble Acid Dye Salts 402
Creping and Dyeing of Acetate Cellulose Fabric Combined 402
Glass Fibers, Dyeing with Water Soluble Acid Dyes on Resin Layer 424
Drying Fabrics—Preheating in a Flame Chamber 424
Printing Textiles—Photographic Production of Patterns 476
Patterned Thermoplastic Fabrics—Local Delustering 476
Printing Device—Screen Printing Table, Combined with Drying Chamber 477
Acid Dyes—Dyeing Cellulose by Introducing Amino Groups 477
Water Repellent Fabrics—Higher Aliphatic Acid Peroxides 477
Flameproofing—Melamine-Pyrophosphoric Acid Treatment 478
Dyeing Apparatus for Fabrics in Rope Form—Circulating Dyebath 478
Sizing—Starch Blended with "Waxy Starch" 478
Cellulose Ethers—Dissolved in Sodium Zincate 479
Flocking Device—Ornamental Effects by Fixing the Flock in Different Angles 479
Water Repellent Fabrics—Zirconium Compounds Decomposed at Elevated Temperatures 521
Delustering Nylon—Antimony Compounds Used 522
Shrinkproofing Wool—Hypochlorite in Concentrated Solutions 522
Printing Indigosols—Adding Alkyl Aromatic Sulfonates 522
Shrinkproofing Textiles—Alkylated Methylomelamines Combined with Nitrogen Bases 563
Transparentizing Fabrics with Amino Resin Compositions 563
Cellulose Acetate Printing—Acid and Direct Dyes—Caprolactum 563
Permanent Finishes—Cellulose Ethers (or Polyvinylalcohols) Combined with Amino Resins 564
Dyeing Cellulose Acetate or Nylon with Insoluble Azo Dyes 564
Dyeing Nylon with Vat Dyes or Indigosols—Improving Fastness to Light 564
Printing Vat Dyestuffs by Fixation with Actinic Rays 583
Tenter Frame—Clips and Pins for Alternating Use 583
Dyeing Apparatus for Vat Dyes—Reduction by Electric Current 584
Finishing Roll for Textiles—Brushing Device 584
Shrinkproofing Wool—Sonic or Ultrasonic Waves 585
Acrylonitrile Solution—Reacted on Alkali Prepared Fibers 659
Delustering—Finely Dispersed Titanium Dioxide 659
Starch Sizes—Alkali Stannate Added 659
Scouring Caustic Impregnated Cellulosic Textiles—Steam After Treatment 660
Shrinkproofing Wool—Chloroprene Polymers Used 738
Delustering—Vinylidene—Vinyl-Polymers 738
Printing Indigosols—Adding Alkyl—or Alkylene Aniline Sulfonic Acid Salts 738
Metallization on Nonconductive Material, Fabrics, Paper, Etc. 756
Dyeing Nylon with Insoluble Acetate Dyes—Steam Aftertreatment 756
Pigment Printing—Condensates of Substituted Guanidines with Aldehydes 756
Cellulose Acetate Fabrics—Two Colored Effects in Partial Saponification 765
Sulfur Dye Preparations—Printing Pastes Containing Alkylolamines 765
Crease Resistance—Testing Method and Apparatus 765
Cellulose and Starch Solutions—Treatment with Nitrogen Oxides 802
Dyeing Cellulose Acetate with Leuco Vat Dyes 802
Dyeing Nylon and Insoluble Acetate Dyes, Mono- and Multifilaments Combined 802
Cellulose Solution—Alkali and Oxydizing Agents used 955
Dyeing Apparatus with Improved Means for Dyebath Circulation 955
Crease Resistance—Testing Methods and Apparatus 956
Oiled Silk Finish—Two-step Process 956
Scouring and Bleaching Wool in the Same Operation—Sodium Chlorite Added 957
Water Repellent Fabrics—Zirconium Salts in State of "Coordination" 957
Peanut Protein for Window Shade Sizes (Arthur and Cheng) 535
Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions, Effect of Various Surface-Active Agents on the (Scanlan, Stirton, Swern and Roe) 455
Peroxide System, Bleaching Goods for Dyeing and Finishing in the Continuous Open-Width (Moore) P497
Personnel, Changes in Research Committee P946
pH and Spectrophotometric Control in Textile and Dye Operations, Some Interesting Applications of (Haller and Odeen) P411
Philadelphia Area, The Wet Processing Industry in the P725
PHILADELPHIA SECTION
Reports P210, P298, P331, P404, P524, P554, P789, P918
Philadelphia Section, Greetings from Chairman P697
Philadelphia Section, Your Convention Host, The (Seibert) P708
Philadelphia Section Report, Correction P865
PHILADELPHIA TEXTILE INSTITUTE STUDENT CHAPTER
Reports P136, P298, P392
Photographic Aids to the Textile Industry (Siegel) P268
Photomicrography, Rapid (Maresh and Krammes) 635
Piece Goods, Low Temperature Wool, Scouring with a Synthetic Organic Detergent (Morgan and Walter) P374
Piece Goods, The Printing of Nylon (Saville) 673
Piece-Goods Preparation, Dyeing and Finishing, Modern Trends In (Rabold) P67

PIEDMONT SECTION

Reports P55, P210, P266, P404, P462, P588, P788, P924
Pigmented Emulsions for Textile Printing (Young) P135
Plastics, The Chemistry of Commercial (Wakeman) P856
President's Address, The (Herrmann) P951
President, Greetings from Your P695
Printing, Block (Chadwick) 833
Printing, Naphthol Dyeing and (Nuttall) P232
Printing of Nylon Piece Goods, The (Saville) 673
Printing of Synthetics, Silk and Wool, Short Aging Processes for the (Saville) P310
Printing, Pigmented Emulsions for Textile (Young) P135
Printing, The Screen, of Textiles (Beton) 683
Prints and Their Control, Problems in Aging Textile (Choquette and Habel) P919
Prize Paper Award Approved by Council, Annual P534
Problems in Aging Textile Prints and Their Control (Choquette and Habel) P919
Problems in the Textile Industry, Solving Corrosion (Worth and Seymour) 735
Processing on Machinery Used in Shrinkage Stabilization Finishing, Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During (Philadelphia Section) P822
Processing, Sequestering Agents; Their Use in Textile (Zussman) P500
Processing, Static in Textile (Lehmicke) P853
Products, Alphabetical Lise of New 877
Program P696
Program for Atlantic City Convention, Preliminary P645
Properties of Textile Materials, Low Temperature (Kaswell) P127
Quality Blend Makes Successful Sales, A (Price) P234
Quartermaster Corps Accelerated Test Method for Evaluating Shrink-Resistant Wool as Developed for 10½-oz. Wool Shirting (Weiner) 289
Rabold Addresses Joint Meeting, Southeastern Section and Georgia Student Chapter P789
Rate, Vat Dyeing: Importance of Initial Exhaustion (Clark and McCleary) P828
Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing, Dimensional Changes Occurring in Spun Viscose (Philadelphia Section) P822
Rayon, Permanent Finishes on Viscose, Depending on Cross-Bonding (Cameron and Morton) 575
Rayon, The Action of Light on Cellulose Acetate, and Nylon Dyed with Duranol, Dispersol, S.R.A., and Solacet Dyes (Egerton) 608
Relationship Between Results of Dynamic Absorption Tests Using Hexagonal and Cylindrical Jars, The (Landsberg, Sembach, and Blum) 744

Report by Convention Committee, A P701
Report of Election Tellers P909
Reports to Corporate Members (Little and Bonnar) P945
Report, Treasurer's and Auditor's P54, P861
RESEARCH COMMITTEE, GENERAL, MEETINGS
One Hundred and Fifty-Seventh P211
One Hundred and Fifty-Eighth P330
One Hundred and Fifty-Ninth P560
One Hundred and Sixtieth P757
Research Committee, News Items from the P946
Research Committee Personnel, Changes in P946
Research Committee Reports P370
Research Committees, Of Interest to Members of P952

RESEARCH HIGHLIGHTS P114, P157, P231, P298, P312, P504, P524, P562, P590, P789

Research Institute and Textile Foundation Research, Recent Results of Textile (Dillon) P934
Resins, Acid Colloids of (Rhode Island Section) P842
Research, Inner Workings of AATCC (Bonnar) P486
Research, Recent, on Cotton Properties at the Southern Regional Research Laboratory (Ward) P122
Research, Recent Results of Textile Research Institute and Textile Foundation (Dillon) P934
Research, Textile Education and (Hayward) P949
Resin Finishing of Textile Fabrics, The (Thomas) P413
Resolution on Louis Atwell Olney P331
Results of Textile Research Institute and Textile Foundation Research, Recent (Dillon) P934
Retirement of Professor Camp P404
RHODE ISLAND SECTION
Reports P210, P298, P369, P371, P622, P680, P788, P865
Rolls in Textile Finishing, Current Trends in Operating Rubber Covered (Fisk) P646
Rules, Trade Practice, and Test Procedures for Textiles (Miller) P274
Sales, A Quality Blend Makes Successful (Price) P234
Sayre to Speak at Convention Banquet (Morris) P680
Scouring with a Synthetic Organic Detergent, Low Temperature Wool Piece Goods (Morgan and Walter) P374
Screen Printing of Textiles, The (Beton) 683
Seibert, Olney Medal to be Awarded to Charles A. P702
Sequestering Agents: Their Use in Textile Processing (Zussman) P500
Shrinkage Control of Wool-Chlorination Processes (Epelberg) P526
Shrinkage, Some Aspects of the Chemical Control of Wool (Gould) P407
Shrinkage Stabilization Finishing, Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During Processing on Machinery Used in (Philadelphia Section) P822
Shrink-Resistant Wool as Developed for 10½-Oz. Wool Shirting, Quartermaster Corps Accelerated Test Method for Evaluating (Weiner) 289
Silicates, Sodium, in the Textile Industry (Merrill) 428
Silk and Wool, Short Aging Processes for the Printing of Synthetics, (Saville) P310
Sizes, Peanut Protein for Window Shade (Arthur and Cheng) 535
Sizing Materials for Nylon Hosiery Yarns, Laboratory Evaluation of (Goldstein) P372
Sodium Silicates in the Textile Industry (Merrill) 428
Solacet Dyes, The Action of Light on Cellulose Acetate Rayon Dyed with Duranol, Dispersol, S.R.A., and (Egerton) 608
Solubilization, The, of Dyestuffs with Surface Active Agents (Mid-West Section) P728
Solutions, An Index of the Water-Repellency of Textiles from the Surface Tension of Aqueous (Schuyten, Weaver and Reid) 364

SOUTH CENTRAL SECTION
Reports P554, P733, P759, P944

SOUTHEASTERN SECTION
Reports P298, P648, P789
Southern Regional Research Laboratory, Recent Research on Cotton Properties at the (Ward) P122
Specialties, Textile Chemical P2
Spectrographic Determination of Chlorine in Textiles (Johnson and Norman) 361
Spectrophotometric Control in Textile and Dye Operations, Some Interesting Applications of pH and (Haller and Odeen) P411
Spectrophotometry, The Elements of Color and (Rhael) P490
Spun Viscose Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing, Dimensional Changes Occurring in (Philadelphia Section) P822
S.R.A. and Solacet Dyes, The Action of Light on Cellulose Acetate Rayon and Nylon Dyed with Duranol, Dispersol, (Egerton) 608
Stability of Calcium Hypochlorite and Bleaching Powder Solutions, Effect of Various Surface-Active Agents on the Penetrating Power and (Scanlan, Stirton, Swern and Roe) 455
Stability of Colored Materials to Radiant Energy, A Proposal for Specifying the (Lowry) 543
Stability of Vat Colors at Elevated Temperatures (Piedmont Section) P213
Standards, Correspondence on Flammability P114
Static in Textile Processing (Lehmicke) P853
Study of Aging Conditions in the Vat Ager, A Fundamental (Fahnoe) 663
Study of Dyeing, The Scientific Approach to the (Vickerstaff) P305
Study of Variables in Padding, Preliminary (New York Section) P159
Supplies Exposition, Textile Wet Processing Equipment and 425
Surface-Active Agents, Effect of Various, on the Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions (Scanlan, Stirton, Swern and Roe) 455
Surface Tension of Aqueous Solutions, An Index of the Water-Repellency of Textiles from the (Schuyten, Weaver and Reid) 364
Survey of Cotton in the Non-Woven Fabrics Industry 582
Survey, Stainless Steel Equipment Corrosion P947
Synthetic Fibers, Latest Developments in the Dyeing and Finishing of (Helmus) P62
Synthetic Fibers, New (Hoff) 459
Synthetic Organic Detergent, Low Temperature Wool Piece Goods Scouring with a (Morgan and Walter) P374
Synthetics, Silk and Wool, Short Aging Processes for the Printing of (Saville) P301
Technical Papers, Abstracts of P718
Tellers, Report of Election P909
Temperature Dyeing, Some Phases of High (Philadelphia Section) P9
Temperature, Low, Properties of Textile Materials (Kaswell) P127
Temperature, The Conditions of, and Humidity in the Fade-Ometer (Nordhammar) 571
Temperatures, Stability of Vat Colors at Elevated (Piedmont Section) P213
Temperatures, The Effect on Finishing Compounds (Noble) P115
Test Method, Quartermaster Corps Accelerated, For Evaluating Shrink Resistant Wool as Developed for 10½-Oz. Wool Shirting (Weiner) 289
Test Procedures for Textiles, Trade Practice Rules and (Miller) P274
Testing Apparatus for the Evaluation of Fire-Resistant Textiles (Rowley and Sonnino) 201
Testing for Moisture in Wool, An Investigation of Methods of (LeCompte and Lipp) 484
Tests, A Re-examination of Present Wetting (Edelstein and Draves) P343
Tests for Quantitatively Evaluating Dye Characteristics and Dyeing Methods, Practical (Northern New England Section) P812
Tests Using Hexagonal and Cylindrical Jars, The Relationship Between Results of Dynamic Absorption (Landsberg, Sembach, and Blum) 744
TEXTILE COLORIST AND CONVERTER
See COLORIST AND CONVERTER SECTION, TEXTILE
Theme P699
Tippy Dyeing, Effect of Metals on (Millson) P378
TRADE NOTES—NEW PRODUCTS 49, 101, 185, 249, 284, 317, 327, 356, 393, 419, 445, 469, 505, 537, 565, 594, 627, 651, 687, 739, 767, 793, 835, 869, 956
Trade Practice Rules and Test Procedures for Textiles (Miller) P274
Treasurer's Report P54, P861
Treating and Handling of Nylon Hosiery to Prevent Snagging During Manufacture (Olson) P60
Trends in Operating Rubber Covered Rolls in Textile Finishing, Current (Fisk) P646
Trends, Modern, In Piece-Goods Preparation, Dyeing and Finishing (Rabold) P67
Twenty-Eighth National Convention P782
UTICA TECHNICAL INSTITUTE STUDENT CHAPTER
Report P944
Vat Ager, A Fundamental Study of Conditions in the (Fahnoe) 663
Vat Colors, Dyeing Mixed Acetate and Viscose Fabrics with (Piedmont Section) P816
Vat Colors, Some Conditions Affecting The Application of (Rhode Island Section) P69
Vat Colors, Stability of, at Elevated Temperatures (Piedmont Section) P213
Vat Dyeing: Importance of Initial Exhaustion Rate (Clark and McCleary) P828
Vat Dyestuffs, Fast Colorings Obtainable with Naphthol and (Nuttall) P923
Vicara—New Fiber Derived From Zein (ter Horst) P335
Viscose Fabrics with Vat Colors, Dyeing Mixed Acetate and (Piedmont Section) P816
Viscose Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing, Dimensional Changes Occurring in Spun (Philadelphia Section) P822
Viscose Rayon, Permanent Finishes on, Depending on Cross-Bonding (Morton and Cameron) 575
Walter E. Hadley Elected Honorary Member P333
Water Absorbency Apparatus, A (Jackson and Roper) 397
Water-Repellency of Textiles, An Index of, from the Surface Tension of Aqueous Solutions (Schuyten, Weaver and Reid) 364
Weather, Deterioration of Cotton Textiles Exposed to the (Bogaty) 253
WESTERN NEW ENGLAND SECTION
Reports P126, P157, P334, P369, P404, P440, P534, P556, P589, P649, P785, P865
Wet Processing Equipment and Supplies Exposition, Textile 425
Wet Processing Industry in The Philadelphia Area, The P725
Wetting Agents on Woolen Cloth, Comparative Efficiencies of (La Fleur) 367
Wetting Tests, A Re-examination of Present (Edelstein and Draves) P343
Window Shade Sizes, Peanut Protein for (Arthur and Cheng) 535
Wool, An Investigation of Methods of Testing for Moisture in (LeCompte and Lipp) 484
Wool, Application of Leucoesters of Vat Dyestuffs to Wool (Luttringhaus) P172
Wool Dyeing, Effect of Metals on Tippy Dyeing (Millson) P378
Wool-Nylon Blends, The Dyeing of (Hug) 661
Wool Piece Goods, Low Temperature, Scouring with a Synthetic Organic Detergent (Morgan and Walter) P374
Wool Raw Stock Detergency, Data on a Laboratory Method for (Leonard and Beck) P348
Wool Shirting, Quartermaster Corps Accelerated Test Method for Evaluating Shrink-Resistant Wool as Developed for 10½-Oz. (Weiner) 289
Wool, Short Aging Processes for the Printing of Synthetics, Silk and (Saville) P310
Wool, Shrinkage Control of, Chlorination Processes (Epelberg) P526
Wool Shrinkage, Some Aspects of the Chemical Control of (Gould) P407
Woolen and Worsted Fabrics, Some Defects Arising in the Finishing of (Whewell) 637
Woolen Cloth, Comparative Efficiencies of Wetting Agents on (La Fleur) 367
Worsted Fabrics, Some Defects Arising in the Finishing of Woolen and (Whewell) 637
Yarns, Factors Influencing Crockfastness of Package-Dyed Naphthol Cotton (South Central Section) P786
Yarns, Laboratory Evaluation of Sizing Materials for Nylon Hosiery (Goldstein) P372
Zein, Vicara—New Fiber Derived From (ter Horst) P335

INDEX BY AUTHOR

ANDERSON, WILLIAM—
Available: Controlled Carpet Beetle Larvae 636
APPLEBY, DOROTHY K.—
The Action of Light on Textile Materials 149
ARTHUR, JETT C. and CHENG, F. W.—
Peanut Protein for Window Shade Sizes 535
ASBURY, C. HARRELL—
The Application of Fast Colors to Mercerized Cotton Hosiery P58
ATKINSON, EDWARD R. and SARGENT, NEIL A.—
Determination of Chlorine Pickup 743
BECK, L. and LEONARD, E. A.—
Data on a Laboratory Method for Wool Raw Stock Detergency P348
BETON, E. S.—
The Screen Printing of Textiles 683
BLUM, R., LANSBERG, M. I. and SEMBACH, C.—
The Relationship Between Results of Dynamic Absorption Tests Using Hexagonal and Cylindrical Jars 744
BOGATY, HERMAN—
Deterioration of Cotton Textiles Exposed to the Weather 253
BONNAR, J. ROBERT—
Inner Workings of AATCC Research P486
BONNAR, J. ROBERT and LITTLE, LEONARD S.—
Reports to Corporate Members P945
BREARLY, G. and STARKIE, J.—
The Hydrosulfites—Production, Properties and Textile Applications 775
BUCK, GEORGE S., JR.—
Flammability of Consumer Textiles P78
CAMERON, W. G. and MORTON, T. H.—
Permanent Finishes on Viscose Rayon Depending on Cross-Bonding 575
CARROLL, W. B., JR.—
Harold M. Chase, The Man P299
CHADWICK, P.—
Block Printing 833
CHASE, HAROLD M.—
Address of the Medalist P302
CHENG, F. W. and ARTHUR, JETT C., JR.—
Peanut Protein for Window Shade Sizes 535
CHOQUETTE, PAUL J. and HABEL, OTTO F.—
Problems in Aging Textile Prints and Their Control P919
CLARK, O. W. and McCLEARY, H. R.—
Vat Dyeing: Importance of Initial Exhaustion Rate P828
COMER, HUGH M.—
Eleven Times Ninety-Six Cents is Better Than Ten Times A Dollar P3
COOK, ALTON A.—
The Function of a Laboratory in the Evaluation of Textile Finishes P313
CRUMLEY, J. A.—
Hosiery Colors and Dyeing P443
DILLON, J. H.—
Recent Results of Textile Research Institute and Textile Foundation Research P934
DRAVES, CARL Z. and EDELSTEIN, SIDNEY M.—
A Re-examination of Present Wetting Tests P343
DUENSING, MARY ELLEN, FLETCHER, HAZEL M. and GILLIAM, JANE F.—
Dimensional Changes of Knit Goods in Laundering 481
EDELSTEIN, SIDNEY M. and DRAVES, CARL Z.—
A Re-examination of Present Wetting Tests P343
EGERTON, G. S.—
The Action of Light on Cellulose Acetate Rayon and Nylon Dyed with Duranol, Dispersol, S.R.A., and Solacet Dyes ... 608
EPELBERG, JACK—
Shrinkage Control of Wool—Chlorination Processes P526
FAHNOE, FREDERICK—
A Fundamental Study of Aging Conditions in the Vat Ager .. 663
FISK, ASA F.—
Current Trends in Operating Rubber Covered Rolls in Textile Finishing P646
FLETCHER, HAZEL M.—
Fabrics for Glass Curtains and Draperies 603
FLETCHER, HAZEL M., DUENSING, MARY ELLEN and GILLIAM, JANE F.—
Dimensional Changes of Knit Goods in Laundering 481
GILLIAM, JANE F., FLETCHER, HAZEL M. and DUENSING, MARY ELLEN—
Dimensional Changes of Knit Goods in Laundering 481
GOLDSTEIN, HERMAN B.—
Laboratory Evaluation of Sizing Materials for Nylon Hosiery Yarns P372
GOULD, JOHN M.—
Some Aspects of the Chemical Control of Wool Shrinkage .. P407
GRIMMEL, H. W.—
Headaches of a Dyestuff Chemist P466
GUNTHER, D. H.—
Evaluation of Leveling Agents P236
HABEL, OTTO F. and CHOQUETTE, PAUL J.—
Problems in Aging Textile Prints and Their Control P919
HALLER, E. D. and ODEEN, M. H.—
Some Interesting Applications of pH and Spectrophotometric Control in Textile and Dye Operations P411
HALLER, DR. R.—
Who Was the Discoverer of Hydrosulfite NF? 105
HAYWARD, BERTRAND W.—
Textile Education and Research P949
HELMUS, W. G.—
Latest Developments in the Dyeing and Finishing of Synthetic Fibers P62
HERRMANN, HENRY F.—
The President's Message P951
HOFF, G. PRESTON—
New Synthetic Fibers 459
HUG, G. T.—
The Dyeing of Wool-Nylon Blends 661
JACKSON, E. C. and ROPER, E. R.—
A Water Absorbency Apparatus 397
JACOBY, RAYMOND W.—
The "New Look" in Textiles P529
JOHNSON, WILLIAM W. A. and NORMAN, DANIEL P.—
The Spectrographic Determination of Chlorine in Textiles .. 361
JOHNSTON, LEE G.—
Consumer Complaints From New Fabrics and Finishes P65
KASWELL, ERNEST R.—
Low Temperature Properties of Textile Materials P127
KIVIRANTA, LAURI—
Bleaching of Linen Piece Goods 546
KRAMMES, R. R. and MARESH, CHARLES—
Rapid Photomicrography 635
La FLEUR, KERMIT S.—
Comparative Efficiencies of Wetting Agents on Woolen Cloth 367
LANDOLT, DR. A.—
Fluorescent Bleaching 353
LANDSBERG, M. I., SEMBACH, C., and BLUM, R.—
The Relationship Between Results of Dynamic Absorption Tests Using Hexagonal and Cylindrical Jars 744
LeCOMPTE, GEORGE C. and LIPP, HENRY H.—
An Investigation of Methods of Testing for Moisture in Wool 484
LEHMICKE, D. J.—
Static in Textile Processing P853
LEONARD, E. A. and BECK, L.—
Data on a Laboratory Method for Wool Raw Stock Detergency P348
LIPP, HENRY H. and LeCOMPTE, GEORGE C.—
An Investigation of Methods of Testing for Moisture in Wool 484
LITTLE, LEONARD S. and BONNAR, J. ROBERT—
Reports to Corporate Members P945
LOWRY, E. M.—
A Proposal for Specifying the Stability of Colored Materials to Radiant Energy 543
LUTTRINGHAUS, DR. HANS—
Application of Leucoesters of Vat Dyestuffs to Wool P172
MACK, PAULINE BEERY—
The Medalist—The Scientist P914
MARESH, CHARLES and KRAMMES R. R.—
Rapid Photomicrography 635
MARSH, PAUL B.—
Fabric Mildew-Resistance Tests with Organisms Tolerant Toward Copper and Mercury 436
McCLEARY, H. R. and CLARK, O. W.—
Vat Dyeing: Importance of Initial Exhaustion Rate P828
MERRILL, REYNOLD C.—
Sodium Silicates in the Textile Industry 428
MEUNIER, PAUL L. and THOMAS, ROBERT J.—
The Dyeing of "Orlon" Acrylic Fiber and Its Use in Colored Textiles P925
MID-WEST SECTION—
The Solubilization of Dyestuffs with Surface Active Agents P728
MILLER, HENRY—
Trade Practice Rules and Test Procedures for Textiles P274
MILLSON, HENRY E.—
Effect of Metals on Tippy Dyeing P378
MOORE, J. L.—
Bleaching Goods for Dyeing and Finishing in the Continuous Open-Width Peroxide System P497
MORGAN, O. M. and WALTER, J. E.—
Low Temperature Wool Piece Goods Scouring with a Synthetic Organic Detergent P374
MORTON, T. H. and CAMERON, W. G.—
Permanent Finishes on Viscose Rayon Depending on Cross-Bonding 575
MOSEMAN, MARJORIE BELL and STOUT, EVELYN E.—
The Effect of Abrasion on Breaking Strength and Elongation of Fifty-Eight Clothing Fabrics 417
NEW YORK SECTION—
Preliminary Study of Variables in Padding P159
Jig Dyeing and the Value of Housings P442
NISBET, A. J.—
Controlled Finishing of Nylon Knit Goods 773
NOBLE, ARTHUR H., JR.—
The Effect of Temperatures on Finishing Compounds P115
NORDHAMMAR, G.—
The Conditions of Temperature and Humidity in the Fade-Ometer 571
NORMAN, DANIEL P. and JOHNSON, WILLIAM W. A.—
The Spectrographic Determination of Chlorine in Textiles .. 361
NORTHERN NEW ENGLAND SECTION—
Practical Tests for Quantitatively Evaluating Dye Characteristics and Dyeing Methods P812
NUTTALL, R. H.—
Naphthol Dyeing and Printing P232
Fast Colorings Obtainable with Naphthol and Vat Dyestuffs P923
ODEEN, M. H., and HALLER, E. D.—
Some Interesting Applications of pH and Spectrophotometric Control in Textile and Dye Operations P411
OLSON, A. J.—
Treating and Handling of Nylon Hosiery to Prevent Snagging During Manufacture P60
PHILADELPHIA SECTION—
Some Phases of High Temperature Dyeing P9
Dimensional Changes Occurring in Spun Viscose Rayon Fabrics During Processing on Machinery Used in Shrinkage Stabilization Finishing P822
PIEDMONT SECTION—
Stability of Vat Colors at Elevated Temperatures P213
Dyeing Mixed Acetate and Viscose Fabrics with Vat Colors P816
PRICE, J. R.—
A Quality Blend Makes Successful Sales P234
RABOLD, C. NORRIS—
Modern Trends in Piece-Goods Preparation, Dyeing and Finishing P67

REID, J. DAVID, SCHUYTEN, H. A. and WEAVER, J. W.—
An Index of the Water-Repellency of Textiles From the Surface Tension of Aqueous Solutions ... 364
RHAEL, EDWARD W.—
The Elements of Color and Spectrophotometry ... P490
RHODE ISLAND SECTION
Some Conditions Affecting the Application of Vat Colors ... P69
Acid Colloids of Resins ... P842
ROE, EDWARD T., SCANLAN, JOHN T., STIRTON, A. J., and SWERN, DANIEL—
Effect of Various Surface-Active Agents on the Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions ... 455
ROPER, E. R. and JACKSON, E. C.—
A Water Absorbency Apparatus ... 397
ROWLEY, B. C., and SONNINO, M.—
Testing Apparatus for the Evaluation of Fire-Resistant Textiles ... 201
SARGENT, NEIL A. and ATKINSON, EDWARD R.—
Determination of Chlorine Pickup ... 743
SAVILLE, A. K.—
Short Aging Processes for the Printing of Synthetics, Silk, and Wool ... P310
The Printing of Nylon Piece Goods ... 673
SAYRE, MORRIS—
Freedom in Action ... P863
SCANLAN, JOHN T., STIRTON, A. J., SWERN, DANIEL and ROE, EDWARD T.—
Effect of Various Surface-Active Agents on the Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions ... 455
SCHULER, GEORGE H.—
The Medalist, the Man ... P913
SCHUYTEN, H. A., WEAVER, J. W. and REID, J. DAVID—
An Index of the Water-Repellency of Textiles from the Surface Tension of Aqueous Solutions ... 364
SEIBERT, CHARLES A.—
Your Convention Host, The Philadelphia Section ... P708
Address of the Medalist ... P916
SEMBACH, C., BLUM, R. and LANDSBERG, M. I.—
The Relationship Between Results of Dynamic Absorption Tests Using Hexagonal and Cylindrical Jars ... 744
SEYMOUR, RAYMOND B.—
The Bonded Fabric Industry ... 453
SEYMOUR, RAYMOND B. and WORTH, W. L. JR.—
Solving Corrosion Problems in the Textile Industry ... 735
SIEGEL, MELVIN—
Photographic Aids to the Textile Industry ... P268
SISLEY, J. P.—
Nonionic Compounds, Their Employment in the Textile Industry ... 513
SMITH, DR. J. E.—
The Finishing of Nylon Fabrics ... 614
SONNINO, M. and ROWLEY, B. C.—
Testing Apparatus for the Evaluation of Fire-Resistant Textiles ... 201
SOUTH CENTRAL SECTION—
Factors Influencing Crockfastness of Package-Dyed Naphthol Cotton Yarns ... P786
STARKIE, J. and BREARLY, G.—
The Hydrosulfites—Production, Properties and Textile Applications ... 775
STAUDT, A. W.—
The Element "X" in Nylon ... P339
STIRTON, A. J., SCANLAN, JOHN T., SWERN, DANIEL and ROE, EDWARD T.—
Effect of Various Surface-Active Agents on the Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions ... 455
STOUT, EVELYN E. and MOSEMAN, MARJORIE BELL—
The Effect of Abrasion on Breaking Strength and Elongation of Fifty-Eight Clothing Fabrics ... 417
SWERN, DANIEL, SCANLAN, JOHN T., STIRTON, A. J. and ROE, EDWARD T.—
Effect of Various Surface-Active Agents on the Penetrating Power and Stability of Calcium Hypochlorite and Bleaching Powder Solutions ... 455
ter HORST, W. P.—
Vicara—New Fiber Derived From Zein ... P335
THOMAS, ROBERT G.—
The Resin Finishing of Textile Fabrics ... P413
THOMAS, ROBERT J. and MEUNIER, PAUL L.—
The Dyeing of "Orlon" Acrylic Fiber and Its Use in Colored Textiles ... P925
THOMPSON, L. S.—
Current Developments in Dyeing and Finishing ... P6
Changing Aspects in Dyeing and Finishing ... P276
TURNBULL, DR. S. G., JR.—
The Dyeing of Broad-Woven Nylon Fabrics ... 747
VICKERSTAFF, T. —
The Scientific Approach to the Study of Dyeing ... P305
WAKEMAN, REGINALD L.—
The Chemistry of Commercial Plastics ... P856
WALLIN, G. R.—
Reaction for Amino and Imino Groups in Textile Materials 746
WALTER, J. E. and MORGAN, O. M.—
Low Temperature Wool Piece Goods Scouring with a Synthetic Organic Detergent ... P374
WARD, KYLE, JR.—
Recent Research on Cotton Properties at the Southern Regional Research Laboratory ... P122
WEAVER, J. W., SCHUYTEN, H. A. and REID, J. DAVID—
An Index of the Water-Repellency of Textiles from the Surface Tension of Aqueous Solutions ... 364
WEINER, LOUIS I.—
Quartermaster Corps Accelerated Test Method for Evaluating Shrink-Resistant Wool as Developed for 10½-Oz. Wool Shirting ... 289
WENGRAF, PAUL—
Patent Digest ... 107, 204, 295, 325, 363, 402, 476, 521, 563, 583, 659, 738, 756, 802, 955
WHEWELL, C. S.—
Some Defects Arising in the Finishing of Woolen and Worsted Fabrics ... 637
WOOD, P. J.—
Harold M. Chase, The Scientist ... P301
WOODRUFF, JACKSON A.—
Direct Dye Selection ... P624
WORTH, W. L. JR. and SEYMOUR, RAYMOND B.—
Solving Corrosion Problems in the Textile Industry ... 735
YOUNG, HENRY L.—
Pigmented Emulsions for Textile Printing ... P135
ZUSSMAN, H. W.—
Sequestering Agents: Their Use in Textile Processing ... P500

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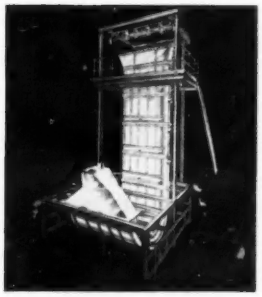

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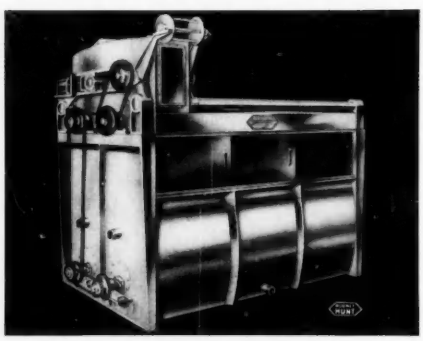

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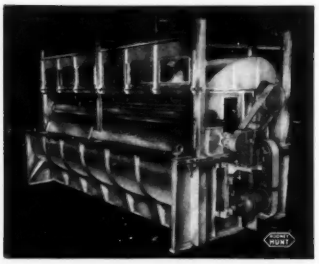

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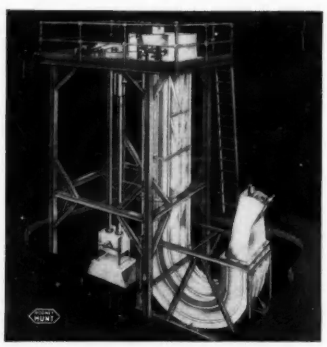

In the DuPont type J-Box pictured, and also in the Becco type, important improvements have been made by Rodney Hunt in the location of drive mechanisms for the oscillating poteyes and in the design of the lower part of the box.

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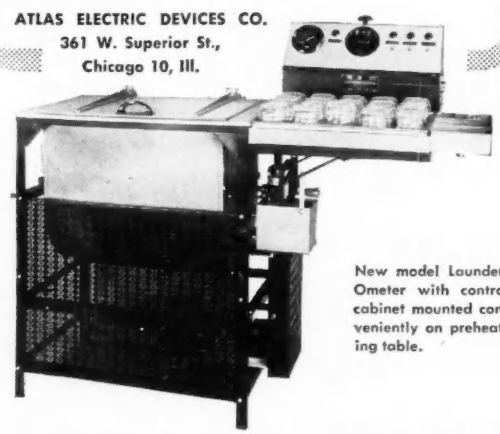

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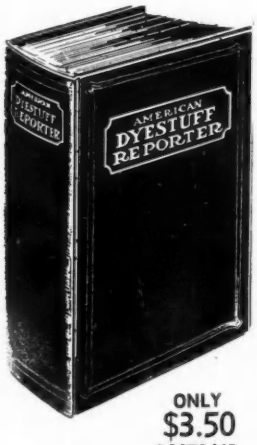

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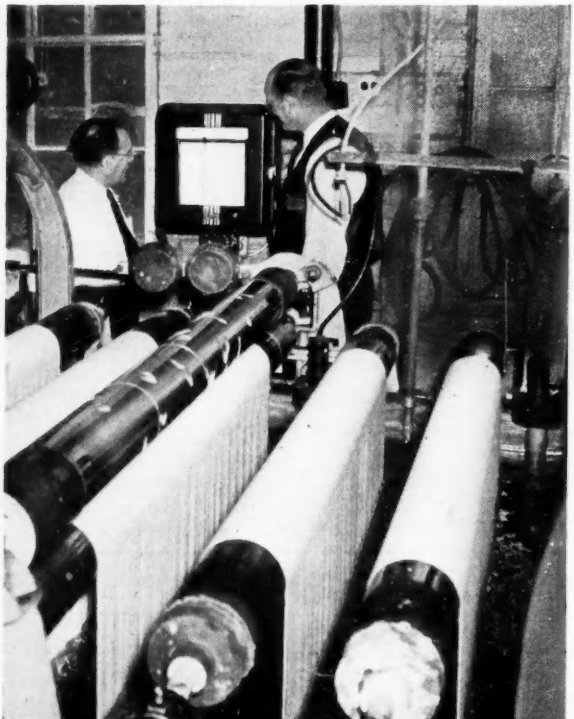

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INDEX TO ADVERTISERS

Aktivin Div., The (Heyden Chemical Corp.)	
Alco Oil & Chemical Corp.	
Althouse Chemical Co., Inc., The	XII
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	III
American Cyanamid Co. (Ind. Chem. Div.)	Back Cover
American Dyewood Company	
Arkansas Company, Inc.	Second Cover
Armour & Co.	XXII
Arnold, Hoffman & Co., Inc.	
Atlantic Chemical Co., Inc.	
Atlantic Refining Company, The	
Atlas Electric Devices Co.	XVII
Barry Chemical Co.	
Becco Sales Corp.	XIX
Bick & Co., Inc.	
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XVIII
Butterworth Sons Co., H. W.	
Calco Chemical Division, American Cyanamid Co.	
Calgon, Inc.	
Campbell & Co., Inc., John	
Carbic Color & Chemical Co., Inc.	X
Carbide & Carbon Chemicals Corp.	
Chem-Col Co., Inc.	
Ciba Company, Inc.	
Colgate-Palmolive-Peet Company	
Commonwealth Color & Chemical Co.	
Crucible Steel Company of America	
Dow Corning Corp.	
Drew & Co., Inc., E. F.	
Du Pont de Nemours & Co., E. I.	
Ammonia Dept.	
Dyestuffs Division	Front Cover
Electrochemicals Dept.	
Fine Chemicals Division	
Emery Industries	
Fancourt & Co., W. F.	
Geigy Company, Inc.	
General Chemical Division, Allied Chemical & Dye Corp.	
General Dyestuff Corp.	V
Girdler Corp., The	
Glycerine Producers' Association	
Grinnel Co., Inc.	
Gross & Co., A.	
Gurley, W. & L. E.	
Hardesty Co., W. C.	
Hart Products Corp.	
Hercules Powder Co.	
Heyden Chemical Corp.	
Hilton-Davis Chemical Co., The	
Hinnekens Machine Company	
Hooker Electrochemical Co.	
Houghton & Co., E. F.	
Interchemical Corp., Textile Colors Div.	
International Nickel Co., Inc.	
International Salt Co., Inc.	
Kali Mfg. Co.	
Kearny Manufacturing Company, Inc.	
Kelco Co.	
Koppers Co., Inc.	
Laurel Soap Mfg. Co., Inc.	XV
Leatex Chemical Co.	
Leeds & Northrup Co.	XX

INDEX TO ADVERTISERS

Manhattan Storage & Warehouse Co.
Mathieson Chemical Corp.
May, Inc., Otto B.
Maywood Chemical Works
Metalsmiths Div., Orange Roller Bearing Co., Inc.
Monsanto Chemical Co. VIII, IX

National Adhesives
National Aniline Division, Allied Chemical & Dye Corp. VII
National Milling & Chemical Co. XIX
Nopco Chemical Co.
Nova Chemical Corp.
Nuodex Products Co., Inc.
Nyanza Color & Chemical Co., Inc.

Onyx Oil & Chemical Co. Third Cover

Pabst Sales Company
Perkins & Sons, Inc., B. F.
Pfizer Co., Inc., Chas.
Philadelphia Quartz Company
Pittsburgh Plate Glass Co.
Procter & Gamble
Prufcoat Laboratories, Inc.

Refined Products Corp.
Richmond Oil Soap & Chemical Co., Inc. XVII
Rodney Hunt Machine Co. XIII, XIV
Rohm & Haas Company
Royce Chemical Co.
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Sandoz Chemical Works, Inc.
Scholler Bros., Inc.
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Sindar Corp.
Socony-Vacuum Oil Co., Inc.
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Stein Hall & Co., Inc.
Swift & Company
Synthron, Inc.

Tennessee Eastman Corp.
Turner & Co., Joseph XXII

Union Carbide & Carbon Corp.
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Vanderbilt Co., Inc., R. T.
Van Vlaanderen Machine Co.
Verduin Machine Corp., John
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Wallerstein Co., Inc.
Watson-Park Company
Winthrop-Stearns, Inc.
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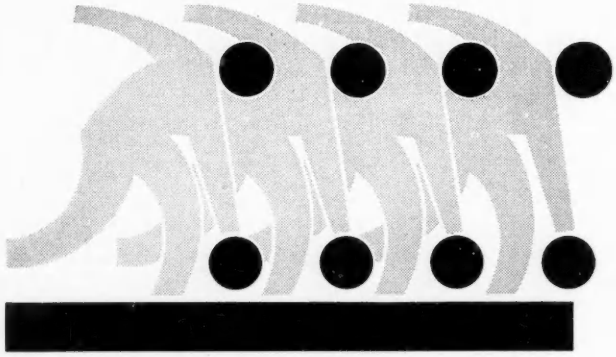

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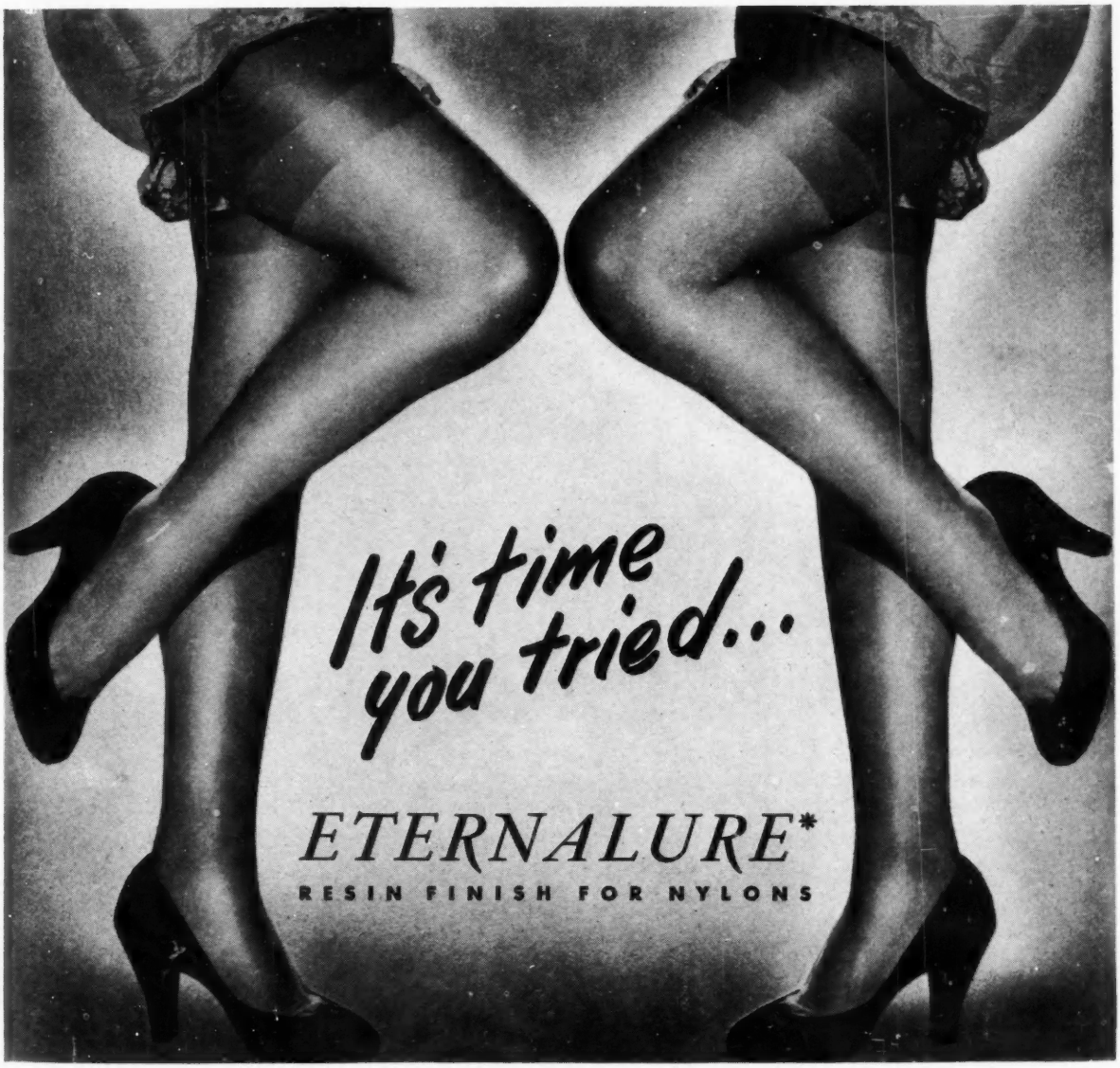

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